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Part II

Department of Commerce

National Oceanic and Atmospheric Administration

50 CFR Part 226

Endangered and Threatened Species; Designation of Critical Habitat for 13 Evolutionarily Significant Units of Pacific Salmon (*Oncorhynchus* spp.) and Steelhead (*O. mykiss*) in Washington, Oregon, and Idaho; Proposed Rule

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 226

[Docket No. 030716175–4327–03; I.D. No. 070303A]

RIN No. 0648–AQ77

Endangered and Threatened Species; Designation of Critical Habitat for 13 Evolutionarily Significant Units of Pacific Salmon (*Oncorhynchus* spp.) and Steelhead (*O. mykiss*) in Washington, Oregon, and Idaho

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration, Commerce.

ACTION: Proposed rule; request for comments.

SUMMARY: We, the National Marine Fisheries Service (NMFS), propose to designate critical habitat for 13 Evolutionarily Significant Units (ESUs) of Pacific salmon (chum, *Oncorhynchus keta*; coho, *O. kisutch*, sockeye, *O. nerka*; chinook, *O. tshawytscha*) and *O. mykiss* (inclusive of anadromous steelhead and resident rainbow trout) listed under the Endangered Species Act of 1973, as amended (ESA). The specific areas proposed for designation in the rule text set out below include approximately 27,553 mi (44,342 km) of lake, riverine, and estuarine habitat in Washington, Oregon, and Idaho, as well as approximately 2,121 mi (3,413 km) of marine nearshore habitat in Puget Sound, Washington. Some of the proposed areas are occupied by two or more ESUs. However, as explained below, we are also considering excluding many of these areas from the final designation based on existing land management plans and policies, voluntary conservation efforts and other factors that could substantially reduce the scope of the final designations. The net economic impacts of ESA section 7 associated with designating the areas described in the proposed rule are estimated to be approximately $223,950,127, but we believe the additional exclusions under review could reduce this impact by up to 90 percent or more. We solicit information and comments from the public on all aspects of the proposal, including information on the economic, national security, and other relevant impacts of the proposed designation. We may revise this proposal and solicit additional comments prior to final designation to address new information received during the comment period.

DATES: Comments on this proposed rule must be received by 5 p.m. P.S.T. on February 14, 2005. Requests for public hearings must be made in writing by January 28, 2005. We have already scheduled public hearings on this proposed rule as follows:

Tuesday, January 11, 2005, from 6:30–9:30 p.m. at the Doubletree Hotel Columbia River, 1401 North Hayden Island Drive in Portland, OR;

Thursday, January 13, 2005, from 6:30–9:30 p.m. at the Red Lion Hotel Columbia Center, 1101 North Columbia Center Blvd. in Kennewick, WA;

Tuesday, January 18, 2005, from 6:30–9:30 p.m. at the Radisson Hotel Seattle Airport, 17001 Pacific Highway South in Seattle, WA; and

Tuesday, January 25, 2005, from 6:30–9:30 p.m. at the Red Lion Hotel Boise Downtown, 1800 Fairview Avenue in Boise, ID.

Details regarding the hearing format and related information will be posted by December 24, 2004, on our Web site at *http://www.nwr.noaa.gov/1salmon/salmesa/crithab/CHsite.htm.*

ADDRESSES: You may submit comments, identified by docket number [030716175–4327–03] and RIN number [0648–AQ77], by any of the following methods:

- E-mail: *critical.habitat.nwr@noaa.gov.* Include docket number [030716175–4327–03] and RIN number [0648–AQ77] in the subject line of the message.
- Federal e-Rulemaking Portal: *http://www.regulations.gov.* Follow the instructions for submitting comments.
- Agency Web site: *http://ocio.nmfs.noaa.gov/ibrm-ssi/index.shtml.* Follow the instructions for submitting comments at *http://ocio.nmfs.noaa.gov/ibrm-ssi/process.shtml.*
- Mail: Submit written comments and information to Chief, NMFS, Protected Resources Division, 525 NE Oregon Street, Suite 500, Portland, OR, 97232–2737. You may hand-deliver written comments to our office during normal business hours at the address given above.
- Fax: 503–230–5435.

FOR FURTHER INFORMATION CONTACT: Steve Stone at the above address, at (503) 231–2317, or by facsimile at (503) 230–5435; or Marta Nammack at (301) 713–1401. The proposed rule, maps, and other materials relating to this proposal can be found on our Web site at *http://www.nwr.noaa.gov/1salmon/salmesa/crithab/CHsite.htm.*

SUPPLEMENTARY INFORMATION:

Background

We are responsible for determining whether species, subspecies, or distinct population segments of Pacific salmon and *O. mykiss* (inclusive of anadromous steelhead and some populations of resident rainbow trout) are threatened or endangered, and for designating critical habitat for them under the ESA (16 U.S.C. 1531 *et seq*). To be considered for ESA listing, a group of organisms must constitute a ''species.'' Section 3 of the ESA defines a species as ''any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature.'' Since 1991 NMFS has identified distinct population segments of Pacific salmon or *O. mykiss* by dividing the U.S. populations of each species into evolutionarily significant units (ESUs) which it determines are substantially reproductively isolated and represent an important component in the evolutionary legacy of the biological species. (56 FR 58612; November 20, 1991.) (In some cases, an ESU may contain a single population of fish.) Under this approach, every Pacific salmon and *O. mykiss* population in the U.S. is part of a distinct population segment that is eligible for listing as threatened or endangered under the ESA. In ESA listing determinations for Pacific salmon and *O. mykiss* since 1991, we have identified 52 ESUs in Washington, Oregon, Idaho and California. Presently 25 of the ESUs are listed as threatened or endangered. One additional ESU (Oregon Coast coho) was listed as threatened from 1998 to 2004 when it was removed from the list of threatened or endangered species as a result of a court order.

In a **Federal Register** document published on June 14, 2004 (69 FR 33101), we proposed to list 27 ESUs as threatened or endangered. The ESUs proposed for listing include 25 currently-listed species, but in most cases the ESUs are being redefined in either or both of two significant ways: by including hatchery fish that are no more than moderately divergent genetically from naturally spawning fish within the ESU, and in the case of *O. mykiss* species, by including some resident trout. We have also proposed to list the previously-listed Oregon Coast coho (redefined to include some such fish reared in hatcheries) and we proposed to list one new ESU (Lower Columbia River *O. mykiss*) previously believed to be extinct in the wild. In this document, ''*O. mykiss*'' ESUs refer to ESUs including populations of both anadromous steelhead and resident

rainbow trout. Also, references to ''salmon'' in this notice generally include all members of the genus *Oncorhynchus*, including *O. mykiss*.

This **Federal Register** document describes proposed critical habitat designations for the following 13 ESUs of salmon and *O. mykiss*: (1) Puget Sound chinook salmon; (2) Lower Columbia River chinook salmon; (3) Upper Willamette River chinook salmon; (4) Upper Columbia River spring-run chinook salmon; (5) Oregon Coast coho salmon; (6) Hood Canal summer-run chum salmon; (7) Columbia River chum salmon; (8) Ozette Lake sockeye salmon; (9) Upper Columbia River *O. mykiss*; (10) Snake River Basin *O. mykiss*; (11) Middle Columbia River *O. mykiss*; (12) Lower Columbia River *O. mykiss*; and (13) Upper Willamette River *O. mykiss*.

Section 3 of the ESA defines critical habitat as ''the specific areas within the geographical area occupied by the species, at the time it is listed, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and specific areas outside the geographical area occupied by the species at the time it is listed that are determined by the Secretary to be essential for the conservation of the species.''

Section 3 of the ESA (16 U.S.C. 1532(3)) also defines the terms ''conserve,'' ''conserving,'' and ''conservation'' to mean ''to use, and the use of, all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this chapter are no longer necessary.''

Section 4 of the ESA requires that before designating critical habitat we must consider the economic impacts, impacts on national security and other relevant impacts of specifying any particular area as critical habitat, and the Secretary may exclude any area from critical habitat if the benefits of exclusion outweigh the benefits of inclusion, unless excluding an area from critical habitat will result in the extinction of the species concerned. Once critical habitat for a salmon or *O. mykiss* ESU is designated, Section 7(a)(2) of the ESA requires that each Federal agency shall, in consultation with and with the assistance of NMFS, ensure that any action authorized, funded or carried out by such agency is not likely to result in the destruction or adverse modification of critical habitat.

Previous Federal Action and Related Litigation

Many Pacific salmon and *O. mykiss* populations in California and the Pacific Northwest have suffered broad declines over the past hundred years. We have conducted several ESA status reviews and status review updates for Pacific salmon and *O. mykiss* in California, Oregon, Washington, and Idaho. The most recent ESA status review and proposed listing determinations were published on June 14, 2004 (69 FR 33101). Six of the currently listed ESUs have final critical habitat designations. Table 1 summarizes the NMFS scientific reviews of West Coast salmon and *O. mykiss* and the ESA listing determinations and critical habitat designations made to date.

TABLE 1.—SUMMARY OF PREVIOUS ESA LISTING ACTIONS AND CRITICAL HABITAT DESIGNATIONS FOR WEST COAST SALMON AND O. MYKISS

Evolutionarily Significant Unit (ESU)	Current Endangered Species Act (ESA) status	Year listed	Previous ESA listing determinations and critical habitat designations—**Federal Register** citations	Previous scientific viability reviews and updates
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		56 FR 58619; 11/20/1991 (Final rule).	
	.....		56 FR 14055; 04/05/1991 (Proposed rule).	
	.....		*Critical Habitat Designations*.	
	.....		58 FR 68543; 12/28/1993 (Final rule).	
Snake River sockeye ESU	Endangered	1991	57 FR 57051; 12/02/1992 (Proposed rule).	NMFS 1991a.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		64 FR 14528; 03/25/1999 (Final rule).	
	.....		63 FR 11750; 03/10/1998 (Proposed rule).	
	.....		*Critical Habitat Designations*.	
	.....		68 FR 55900; 09/29/2003 (removal).	
	.....		65 FR 7764; 02/16/2000 (Final rule)	NMFS 1998d.
Ozette Lake sockeye ESU	Threatened	1999	63 FR 11750; 03/10/1998 (Proposed rule).	NMFS 1997f.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		59 FR 440; 01/01/1994 (Final rule).	
	.....		57 FR 27416; 06/19/1992 (Proposed rule).	
	.....		55 FR 49623; 11/30/1990 (Final rule).	
	.....		55 FR 12831, 04/06/1990 (Emergency rule).	
	.....		55 FR 102260; 03/20/1990 (Proposed rule).	
	.....		54 FR 10260; 08/04/1989 (Emergency rule).	
	.....		52 FR 6041; 02/27/1987 (Final rule).	

TABLE 1.—SUMMARY OF PREVIOUS ESA LISTING ACTIONS AND CRITICAL HABITAT DESIGNATIONS FOR WEST COAST SALMON AND O. MYKISS—Continued

Evolutionarily Significant Unit (ESU)	Current Endangered Species Act (ESA) status	Year listed	Previous ESA listing determinations and critical habitat designations—**Federal Register** citations	Previous scientific viability reviews and updates
Sacramento River winter-run chinook ESU.	Endangered	1994	*Critical Habitat Designations*.	
	.....		65 FR 7764; 02/16/2000 (Final rule).	
	.....		63 FR 11482; 03/09/1998 (Proposed rule).	
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		64 FR 50394; 09/16/1999 (Final rule).	
	.....		63 FR 11482; 03/09/1998 (Proposed rule).	
	.....		*Critical Habitat Designations*.	
	.....		68 FR 55900; 09/29/2003 (removal).	
	.....		68 FR 55900; 09/29/2003 (removal).	
	.....		65 FR 7764; 02/16/2000 (Final rule)	NMFS 1998b.
Central Valley spring-run chinook ESU	Threatened	1999	63 FR 11482; 03/09/1998 (Proposed rule).	NMFS 1999d.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		64 FR 50394; 09/16/1999 (Final rule).	
	.....		63 FR 11482; 03/09/1998 (Proposed rule).	
	.....		*Critical Habitat Designations*.	
	.....		68 FR 55900; 09/29/2003 (removal).	
	.....		65 FR 7764; 02/16/2000 (Final rule)	NMFS 1998b.
California Coastal chinook ESU	Threatened	1999	63 FR 11482; 03/09/1998 (Proposed rule).	NMFS 1999d.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		64 FR 14308; 03/24/99 (Final rule).	
	.....		63 FR 11482; 03/09/1998 (Proposed rule).	
	.....		*Critical Habitat Designations*.	
	.....		68 FR 55900; 09/29/2003 (removal)	NMFS 1998b.
	.....		65 FR 7764; 02/16/2000 (Final rule)	NMFS 1998e.
Upper Willamette River chinook ESU ..	Threatened	1999	63 FR 11482; 03/09/1998 (Proposed rule).	NMFS 1999c.
	.....		.....	NMFS 1998b
	.....		*Listing Determinations*	NMFS 1998e.
Lower Columbia River chinook ESU	Threatened	1999	69 FR 33102; 06/14/04 (Proposed rule).	NMFS 1999c.
	.....		64 FR 14308; 03/24/99 (Final rule).	
	.....		63 FR 11482; 03/09/1998 (Proposed rule).	
	.....		*Critical Habitat Designations*.	
	.....		68 FR 55900; 09/29/2003 (removal).	
	.....		65 FR 7764; 02/16/2000 (Final rule).	
	.....		63 FR 11482; 03/09/1998 (Proposed rule).	
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		64 FR 14308; 03/24/99 (Final rule).	
	.....		63 FR 11482; 03/09/1998 (Proposed rule).	
	.....		*Critical Habitat Designations*.	
	.....		68 FR 55900; 09/29/2003 (removal)	NMFS 1998b.
	.....		65 FR 7764; 02/16/2000 (Final rule)	NMFS 1998e.
Upper Columbia River spring-run chinook ESU.	Endangered	1999	63 FR 11482; 03/09/1998 (Proposed rule).	NMFS 1999c.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		64 FR 14308; 03/24/99 (Final rule).	
	.....		63 FR 11482; 03/09/1998 (Proposed rule).	
	.....		*Critical Habitat Designations*.	

TABLE 1.—SUMMARY OF PREVIOUS ESA LISTING ACTIONS AND CRITICAL HABITAT DESIGNATIONS FOR WEST COAST SALMON AND O. MYKISS—Continued

Evolutionarily Significant Unit (ESU)	Current Endangered Species Act (ESA) status	Year listed	Previous ESA listing determinations and critical habitat designations—**Federal Register** citations	Previous scientific viability reviews and updates
	.....		68 FR 55900; 09/29/2003 (removal)	NMFS 1998b.
	.....		65 FR 7764; 02/16/2000 (Final rule)	NMFS 1998e.
Puget Sound chinook ESU	Threatened	1999	63 FR 11482; 03/09/1998 (Proposed rule).	NMFS 1999c.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		63 FR 1807; 0/12/1998 (Proposal withdrawn).	
	.....		59 FR 66784; 12/28/1994 (Proposed rule).	
	.....		59 FR 42529; 08/18/1994 (Emergency rule).	
	.....		57 FR 23458; 06/03/1992 (Correction).	
	.....		57 FR 14653; 04/22/1992 (Final rule).	
	.....		56 FR 29547; 06/27/1991 (Proposed rule).	NMFS 1991c.
Snake River fall-run chinook ESU	Threatened	1992	*Critical Habitat Designations*	NMFS 1999d.
	.....		58 FR 68543; 12/28/1993 (Final rule).	
	.....		57 FR 57051; 12/02/1992 (Proposed rule).	
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		63 FR 1807; 0/12/1998 (Proposal withdrawn).	
	.....		59 FR 66784; 12/28/1994 (Proposed rule).	
	.....		59 FR 42529; 08/18/1994 (Emergency rule).	
	.....		57 FR 23458; 06/03/1992 (Correction).	
	.....		57 FR 34639; 04/22/92 (Final rule).	
	.....		56 FR 29542; 06/27/1991 (Proposed rule).	
	.....		*Critical Habitat Designations*.	
	.....		58 FR 68543; 12/28/1993 (Final rule) ..	NMFS 1991b.
Snake River spring/summer-run chinook ESU.	Threatened	1992	57 FR 57051; 12/02/1992 (Proposed rule).	NMFS 1998b.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		61 FR 56138; 10/31/1996 (Final rule).	
	.....		60 FR 38011; 07/25/1995 (Proposed rule).	
	.....		*Critical Habitat Designations*.	
	.....		64 FR 24049; 05/05/1999 (Final rule) ..	Bryant 1994
Central California Coast coho ESU	Threatened	1996	62 FR 62791; 11/25/1997 (Proposed rule).	NMFS 1995a.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		62 FR 24588; 05/06/1997 (Final rule).	
	.....		60 FR 38011; 07/25/1995 (Proposed rule).	NMFS 1997a.
	.....		*Critical Habitat Designations*	NMFS 1996c.
	.....		64 FR 24049; 05/05/1999 (Final rule) ..	NMFS 1996e.
Southern Oregon/Northern California Coast coho ESU.	Threatened	1997	62 FR 62791; 11/25/1997 (Proposed rule).	NMFS 1995a.
	.....		.....	NMFS 1997a.
	Proposed		.....	NMFS 1996b.
Oregon Coast coho ESU	Threatened*	1998	*Listing Determinations*	NMFS 1996d.
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		69 FR 19975; 04/15/2004 (Candidate list).	
	.....		63 FR 42587; 08/10/1998 (Final rule).	
	.....		62 FR 24588; 05/06/1997 (Proposal withdrawn).	

TABLE 1.—SUMMARY OF PREVIOUS ESA LISTING ACTIONS AND CRITICAL HABITAT DESIGNATIONS FOR WEST COAST SALMON AND O. MYKISS—Continued

Evolutionarily Significant Unit (ESU)	Current Endangered Species Act (ESA) status	Year listed	Previous ESA listing determinations and critical habitat designations—**Federal Register** citations	Previous scientific viability reviews and updates
	.....		61 FR 56138; 10/31/1996 (6 mo. extension).	
	.....		60 FR 38011; 07/25/1995 (Proposed rule).	
	.....		*Critical Habitat Designations*.	
	.....		68 FR 55900; 09/29/2003 (removal).	
	.....		65 FR 7764; 02/16/2000 (Final rule).	
	.....		64 FR 24998; 05/10/1999 (Proposed rule).	NMFS 1995a.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		69 FR 19975; 04/15/2004 (Candidate list).	
	.....		60 FR 38011; 07/25/1995 (Not warranted).	NMFS 1996e.
	Proposed		*Critical Habitat Designations*	NMFS 1995a.
Lower Columbia River coho ESU	Threatened	1995	n/a	NMFS 1991a.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		64 FR 14508; 03/25/1999 (Final rule).	
	.....		63 FR 11774; 03/10/1998 (Proposed rule).	
	.....		*Critical Habitat Designations*.	
	.....		68 FR 55900; 09/29/2003 (removal)	NMFS 1997e.
	.....		65 FR 7764; 02/16/2000 (Final rule)	NMFS 1999b.
Columbia River chum ESU	Threatened	1999	63 FR 11774; 03/10/1998 (Proposed rule).	NMFS 1999c.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		64 FR 14508; 03/25/1999 (Final rule).	
	.....		63 FR 11774; 03/10/1998 (Proposed rule).	
	.....		*Critical Habitat Designations*	NMFS 1996d.
	.....		68 FR 55900; 09/29/2003 (removal)	NMFS 1997e.
	.....		65 FR 7764; 02/16/2000 (Final rule)	NMFS 1999b.
Hood Canal summer-run chum ESU	Threatened	1999	63 FR 11774; 03/10/1998 (Proposed rule).	NMFS 1999c.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		67 FR 21568; 05/01/2002 (Redefinition of ESU).	
	.....		62 FR 43937; 08/18/1997 (Final rule).	
	.....		61 FR 41541; 08/09/1996 (Proposed rule).	
	.....		*Critical Habitat Designations*.	
	.....		68 FR 55900; 09/29/2003 (removal).	
	.....		65 FR 7764; 02/16/2000 (Final rule)	NMFS 1996b.
Southern California *O. mykiss*$^{+}$ ESU ..	Endangered	1997	64 FR 5740; 03/10/1999 (Proposed rule).	NMFS 1997b.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		62 FR 43937; 08/18/1997 (Final rule).	
	.....		61 FR 41541; 08/09/1996 (Proposed rule).	
	.....		*Critical Habitat Designations*.	
	.....		68 FR 55900; 09/29/2003 (removal).	
	.....		65 FR 7764; 02/16/2000 (Final rule)	NMFS 1996b.
South-Central California Coast *O. mykiss* ESU.	Threatened	1997	64 FR 5740; 03/10/1999 (Proposed rule).	NMFS 1997b.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		62 FR 43937; 08/18/1997 (Final rule).	

TABLE 1.—SUMMARY OF PREVIOUS ESA LISTING ACTIONS AND CRITICAL HABITAT DESIGNATIONS FOR WEST COAST SALMON AND O. MYKISS—Continued

Evolutionarily Significant Unit (ESU)	Current Endangered Species Act (ESA) status	Year listed	Previous ESA listing determinations and critical habitat designations—**Federal Register** citations	Previous scientific viability reviews and updates
	.....		61 FR 41541; 08/09/1996 (Proposed rule).	
	.....		*Critical Habitat Designations*.	
	.....		68 FR 55900; 09/29/2003 (removal).	
	.....		65 FR 7764; 02/16/2000 (Final rule)	NMFS 1996b.
Central California Coast *O. mykiss* ESU.	Threatened	1997	64 FR 5740; 03/10/1999 (Proposed rule).	NMFS 1997b.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	NMFS 1996b.
	.....		63 FR 13347; 03/19/1998 (Final rule) ..	NMFS 1997b.
	.....		62 FR 43974; 08/18/1997 (6 mo. extension).	NMFS 1997c.
	.....		61 FR 41541; 08/09/1996 (Proposed rule).	NMFS 1997d.
California Central Valley *O. mykiss* ESU.	Threatened	1998	*Critical Habitat Designations*	NMFS 1998a.
	.....		68 FR 55900; 09/29/2003 (removal).	
	.....		65 FR 7764; 02/16/2000 (Final rule).	
	.....		64 FR 5740; 03/10/1999 (Proposed rule).	
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		65 FR 36074; 06/07/2000 (Final rule).	
	.....		65 FR 6960; 02/11/2000 (Proposed rule).	
	.....		63 FR 13347; 03/19/1998 (Not Warranted).	
	.....		62 FR 43974; 08/18/1997 (6 mo. extension).	NMFS 1996b.
	.....		61 FR 41541; 08/09/1996 (Proposed rule).	NMFS 1997c.
	.....		*Critical Habitat Designations*	NMFS 1998a.
Northern California *O. mykiss* ESU	Threatened	2000	n/a	NMFS 2000.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		64 FR 14517; 03/25/1999 (Final rule).	
	.....		63 FR 11798; 03/10/1998 (Proposed rule).	
	.....		62 FR 43974; 08/18/1997 (6 mo. extension).	
	.....		61 FR 41541; 08/09/1996 (Proposed rule).	
	.....		*Critical Habitat Designations*	NMFS 1996b.
	.....		68 FR 55900; 09/29/2003 (removal)	NMFS 1997d.
	.....		65 FR 7764; 02/16/2000 (Final rule)	NMFS 1999a.
Upper Willamette River *O. mykiss* ESU	Threatened	1999	64 FR 5740; 03/10/1999 (Proposed rule).	NMFS 1999c.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		63 FR 13347; 03/19/1998 (Final rule).	
	.....		62 FR 43974; 08/18/1997 (6 mo. extension).	
	.....		61 FR 41541; 08/09/1996 (Proposed rule).	
	.....		*Critical Habitat Designations*	NMFS 1996b.
	.....		68 FR 55900; 09/29/2003 (removal)	NMFS 1997c.
	.....		65 FR 7764; 02/16/2000 (Final rule)	NMFS 1997d.
Lower Columbia River *O. mykiss* ESU	Threatened	1998	64 FR 5740; 03/10/1999 (Proposed rule).	NMFS 1998a.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		64 FR 14517; 03/25/1999 (Final rule).	
	.....		63 FR 11798; 03/10/1998 (Proposed rule).	

TABLE 1.—SUMMARY OF PREVIOUS ESA LISTING ACTIONS AND CRITICAL HABITAT DESIGNATIONS FOR WEST COAST SALMON AND O. MYKISS—Continued

Evolutionarily Significant Unit (ESU)	Current Endangered Species Act (ESA) status	Year listed	Previous ESA listing determinations and critical habitat designations—**Federal Register** citations	Previous scientific viability reviews and updates
	.....		62 FR 43974; 08/18/1997 (6 mo. extension).	
	.....		61 FR 41541; 08/09/1996 (Proposed rule).	
	.....		*Critical Habitat Designations*	NMFS 1996b.
	.....		68 FR 55900; 09/29/2003 (removal)	NMFS 1997d.
	.....		65 FR 7764; 02/16/2000 (Final rule)	NMFS 1999a.
Middle Columbia River *O. mykiss* ESU	Threatened	1999	64 FR 5740; 03/10/1999 (Proposed rule).	NMFS 1999c.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		62 FR 43937; 08/18/1997 (Final rule).	
	.....		61 FR 41541; 08/09/1996 (Proposed rule).	
	.....		*Critical Habitat Designations*.	
	.....		68 FR 55900; 09/29/2003 (removal).	
	.....		65 FR 7764; 02/16/2000 (Final rule)	NMFS 1996b.
Upper Columbia River *O. mykiss* ESU	Endangered	1997	64 FR 5740; 03/10/1999 (Proposed rule).	NMFS 1997b.
	.....		*Listing Determinations*.	
	.....		69 FR 33102; 06/14/04 (Proposed rule).	
	.....		62 FR 43937; 08/18/1997 (Final rule).	
	.....		61 FR 41541; 08/09/1996 (Proposed rule).	
	.....		*Critical Habitat Designations*.	
	.....		68 FR 55900; 09/29/2003 (removal).	
	.....		65 FR 7764; 02/16/2000 (Final rule)	NMFS 1996b.
Snake River Basin *O. mykiss* ESU	Threatened	1997	64 FR 5740; 03/10/1999 (Proposed rule).	NMFS 1997b.

* Previously listed as a ''threatened'' species (63 FR 42587, August 10, 1998). Threatened listing set aside in *Alsea Valley Alliance v. Evans* (*Alsea Valley Alliance v. Evans*, 161 F.Supp.2d 1154 (D.Or. 2001), *appeals dismissed,* 358 F.3d 1181 (9th Cir. 2004).

+ *O. mykiss* ESUs include both anadromous ''steelhead'' and resident ''rainbow trout'' in certain areas (see 69 FR 33101; July 14, 2004).

On February 16, 2000, we published final critical habitat designations for 19 ESUs, thereby completing designations for all 25 ESUs listed at the time (65 FR 7764). The 19 designations included more than 150 river subbasins in Washington, Oregon, Idaho, and California. Within each occupied subbasin, we designated as critical habitat those lakes and river reaches accessible to listed fish along with the associated riparian zone, except for reaches on Indian land. Areas considered inaccessible included areas above long-standing natural impassable barriers and areas above impassable dams, but not areas above ephemeral barriers such as failed culverts.

In considering the economic impact of the February 16, 2000, action, we determined that the critical habitat designations would impose very little or no additional requirements on Federal agencies beyond those already associated with the listing of the species themselves. NMFS reasoned that since it was designating only occupied habitat, there would be few or no actions that destroy or adversely modify critical habitat that did not also jeopardize the continued existence of the species. Therefore, the agency reasoned that there would be no economic impact as a result of the designations (65 FR 7764, 7765; February 16, 2000).

The National Association of Homebuilders (NAHB) challenged the designations in District Court in Washington, DC on the ground that the agency did not adequately consider the economic impacts of the critical habitat designations (*National Association of Homebuilders* v. *Evans,* 2002 WL 1205743 No. 00–CV–2799 (D.D.C.)). NAHB also challenged NMFS' designation of Essential Fish Habitat (EFH) (Pacific Coast Salmon Fishery Management Plan, 2000). While the NAHB litigation was pending, the Court of Appeals for the 10th Circuit issued its decision in *New Mexico Cattlegrowers' Association* v. *U.S. Fish and Wildlife Service,* 248 F.3d 1277 (10th Cir. 2001) (*NMCA*). In that case, the Court rejected the U.S. Fish and Wildlife Service (FWS) approach to economic analysis, which was similar to the approach taken by NMFS in the final rule designating critical habitat for 19 ESUs of West Coast salmon and *O. mykiss.* The Court ruled that ''Congress intended that the FWS conduct a full analysis of all of the economic impacts of a critical habitat designation, regardless of whether those impacts are attributable co-extensively to other causes.'' Subsequent to the 10th Circuit decision, we entered into and sought judicial approval of a consent decree resolving the NAHB litigation. That decree provided for the withdrawal of critical habitat designations for the 19 salmon and *O. mykiss* ESUs and dismissed NAHB's challenge to the EFH designations. The District Court approved the consent decree and vacated the critical habitat designations by Court order on April 30, 2002 (*National Ass'n of Homebuilders* v. *Evans,* 2002 WL 1205743 (D.D.C. 2002)).

Subsequently, in response to a complaint filed in the District of Columbia by the Pacific Coast Federation of Fishermen's Associations, Institute for Fisheries Resources, the Center for Biological Diversity, the Oregon Natural Resources Council, the Pacific Rivers Council, and the

Environmental Protection Information Center (PCFFA *et al.*) alleging that NMFS had failed to timely designate critical habitat for the 19 ESUs for which critical habitat had been vacated (as well as the northern California *O. mykiss* ESU), PCFFA and NMFS filed—and the court approved—an agreement resolving that litigation and establishing a schedule for designation of critical habitat. On July 13, 2004, the D.C. District Court approved a First Amendment to the Consent Decree and Stipulated Order of Dismissal providing for a revised schedule for the submission of proposed and final rules designating critical habitat for the 20 ESUs to the **Federal Register.** For those ESUs that are included on the list of threatened and endangered species as of September 30, 2004, and which fall under the responsibility of the Northwest Regional office of NMFS, proposed rules must be submitted to the **Federal Register** for publication no later than September 30, 2004. For those ESUs that are included on the list of threatened and endangered species as of November 30, 2004, and which fall under the responsibility of NMFS' Southwest Regional office, proposed rules must be submitted to the **Federal Register** for publication no later than November 30, 2004. For those of the 20 ESUs addressed in the proposed rules and included on the lists of threatened and endangered species as of June 15, 2005, final rules must be submitted to the **Federal Register** for publication no later than June 15, 2005. On September 17, 2004, NMFS filed a motion with the court seeking an additional 60 day extension of the deadline for submitting to the **Federal Register** a proposed rule for the 13 ESUs subject to the September 30, 2004, deadline. On October 7, 2004, the court granted the motion.

Past critical habitat designations have generated considerable public interest. Therefore, in an effort to engage the public early in this rulemaking process, we published an advance notice of proposed rulemaking (ANPR) on September 29, 2003 (68 FR 55926). The ANPR identified issues for consideration and evaluation, and solicited comments regarding these issues and information regarding the areas and species under consideration. We received numerous comments in response to the ANPR and considered them during development of this proposed rulemaking. Where applicable we have referenced these comments in this **Federal Register** notice as well as in other documents supporting this proposed rule. We encourage those who submitted comments on the ANPR to review and comment on this proposed rule as well. We will address all comments in the final rule.

Methods and Criteria Used To Identify Proposed Critical Habitat

Salmon Life History

Pacific salmon are anadromous fish, meaning adults migrate from the ocean to spawn in freshwater lakes and streams where their offspring hatch and rear prior to migrating back to the ocean to forage until maturity. The migration and spawning times vary considerably across and within species and populations (Groot and Margolis, 1991). At spawning, adults pair to lay and fertilize thousands of eggs in freshwater gravel nests or ''redds'' excavated by females. Depending on lake/stream temperatures, eggs incubate for several weeks to months before hatching as ''alevins'' (a larval life stage dependent on food stored in a yolk sac). Following yolk sac absorption, alevins emerge from the gravel as young juveniles called ''fry'' and begin actively feeding. Depending on the species and location, juveniles may spend from a few hours to several years in freshwater areas before migrating to the ocean. The physiological and behavioral changes required for the transition to salt water result in a distinct ''smolt'' stage in most species. On their journey juveniles must migrate downstream through every riverine and estuarine corridor between their natal lake or stream and the ocean. For example, smolts from Idaho will travel as far as 900 miles from the inland spawning grounds. En route to the ocean the juveniles may spend from a few days to several weeks in the estuary, depending on the species. The highly productive estuarine environment is an important feeding and acclimation area for juveniles preparing to enter marine waters.

Juveniles and subadults typically spend from 1 to 5 years foraging over thousands of miles in the North Pacific Ocean before returning to spawn. Some species, such as coho and chinook salmon, have precocious life history types (primarily male fish known as ''jacks'') that mature and spawn after only several months in the ocean. Spawning migrations known as ''runs'' occur throughout the year, varying by species and location. Most adult fish return or ''home'' with great fidelity to spawn in their natal stream, although some do stray to non-natal streams. Salmon species die after spawning, except anadromous *O. mykiss* which may return to the ocean and make one or more repeat spawning migrations. This complex life cycle gives rise to complex habitat needs, particularly during the freshwater phase (see review by Spence *et al.,* 1996). Spawning gravels must be of a certain size and free of sediment to allow successful incubation of the eggs. Eggs also require cool, clean, and well-oxygenated waters for proper development. Juveniles need abundant food sources, including insects, crustaceans, and other small fish. They need places to hide from predators (mostly birds and bigger fish), such as under logs, root wads and boulders in the stream, and beneath overhanging vegetation. They also need places to seek refuge from periodic high flows (side channels and off channel areas) and from warm summer water temperatures (coldwater springs and deep pools). Returning adults generally do not feed in fresh water but instead rely on limited energy stores to migrate, mature, and spawn. Like juveniles, they also require cool water and places to rest and hide from predators. During all life stages salmon require cool water that is free of contaminants. They also require rearing and migration corridors with adequate passage conditions (water quality and quantity available at specific times) to allow access to the various habitats required to complete their life cycle.

The homing fidelity of salmon has created a metapopulation structure with distinct populations distributed among watersheds (McElhany *et al.,* 2000). Low levels of straying result in regular genetic exchange among populations, creating genetic similarities among populations in adjacent watersheds. Maintenance of the meta-population structure requires a distribution of populations among watersheds where environmental risks (*e.g.*, from landslides or floods) are likely to vary. It also requires migratory connections among the watersheds to allow for periodic genetic exchange and alternate spawning sites in the case that natal streams are inaccessible due to natural events such as a drought or landslide. More detailed information describing habitat and life history characteristics of the ESUs addressed in this proposed rulemaking is described later in this document.

Identifying the Geographical Area Occupied by the Species and Specific Areas within the Geographical Area

In past critical habitat designations, we had concluded that the limited availability of species distribution data prevented mapping salmonid critical habitat at a scale finer than occupied river basins. (65 FR 7764; February 16, 2000). Therefore, the 2000 designations defined the ''geographical area occupied

by the species, at the time of listing'' as all accessible river reaches within the current range of the listed species. Comments received on the ANPR expressed a range of opinions about the appropriate scale for defining occupied areas; many expressed concern that the 2000 designations were overly broad and inclusive and encouraged us to use a finer scale in designating critical habitat for salmon.

In the 2000 designations, we relied on the U.S. Geological Survey's (USGS) identification of subbasins, which was the finest scale mapped by USGS at that time, to define the ''specific areas'' within the geographical area occupied by the species. The subbasin boundaries are based on an area's topography and hydrography, and USGS has developed a uniform framework for mapping and cataloging drainage basins using a unique hydrologic unit code (HUC) identifier (Seaber *et al.* 1986). The code contains separate two-digit identifier fields wherein the first two digits refer to a region comprising a relatively large drainage area (*e.g.,* Region 17 for the entire Pacific Northwest), while subsequent fields identify smaller nested drainages. Under this convention, fourth field hydrologic units contain eight digits and are commonly referred to as ''HUC4s'' or ''subbasins.'' In the 2000 designations, then, we identified as critical habitat all areas accessible to listed salmon within an occupied HUC4 subbasin. Since the previous designations in 2000, additional scientific information has significantly improved our ability to identify freshwater and estuarine areas occupied by salmonids and to group the occupied stream reaches into finer scale ''specific areas.''

We can now be somewhat more precise about the ''geographical area occupied by the species'' because Federal, state, and tribal fishery biologists have made progress mapping actual species distribution at the level of stream reaches. The current mapping identifies occupied stream reaches where the species has been observed. It also identifies stream reaches where the species is presumed to occur based on the professional judgment of biologists familiar with the watershed. However, such presumptions may not be sufficiently rigorous or consistent to support a critical habitat designation, and we therefore solicit information as to which stream reaches are actually occupied by the various species addressed in this rule.

Much of the available data can now be accessed and analyzed using geographic information systems (GIS) to produce consistent and fine-scale maps. As a result, nearly all salmonid freshwater and estuarine habitats in Washington, Oregon, and Idaho are now mapped and available in GIS at a scale of 1:24,000 (NMFS, 2004a). Previous distribution data were often compiled at a much coarser scale of 1:100,000 or greater. We made use of these finer-scale data for the current critical habitat designations, and we now believe that they enable a more accurate delineation of the ''geographical area occupied by the species'' referred to in the ESA definition of critical habitat. The final critical habitat designations will be based on the final listing decisions for these ESUs due by June 2005 and thus will reflect occupancy ''at the time of listing'' as the ESA requires.

We are now also able to identify ''specific areas'' (section 3(5)(a)) and ''particular areas'' (section 4(b)(2)) at a finer scale than in 2000. Since 2000, various Federal agencies have identified fifth field hydrologic units (referred to as ''HUC5s'' or hereafter ''watersheds'') throughout the Pacific Northwest using the USGS mapping conventions referred to above. This information is now generally available from these agencies and via the internet (California Spatial Information Library, 2004; Interior Columbia Basin Ecosystem Management Project, 2003; Regional Ecosystem Office, 2004). We used this information to organize critical habitat information systematically and at a scale that is relevant to the spatial distribution of salmon. Organizing information at this scale is especially relevant to salmonids, since their innate homing ability allows them to return to the watersheds where they were born. Such site fidelity results in spatial aggregations of salmonid populations that generally correspond to the area encompassed by subbasins or HUC5 watersheds (Washington Department of Fisheries *et al.,* 1992; Kostow, 1995; McElhany *et al.,* 2000). However, it must be recognized that even the fifth field watershed is a very broad geographic unit. We therefore solicit information on ways to further improve the geographical precision of our habitat analysis.

The USGS maps watershed units as polygons, bounding a drainage area from ridge-top to ridge-top, encompassing streams, riparian areas and uplands. Within the boundaries of any watershed, there are stream reaches not occupied by the species. Land areas within the HUC boundaries are also generally not ''occupied'' by the species (though certain areas such as flood plains or side channels may be occupied at some times of some years). We used the watershed boundaries as a basis for aggregating occupied stream reaches, for purposes of delineating ''specific'' areas. This document refers to the occupied stream reaches within the watershed boundary as the ''habitat area'' to distinguish it from the entire area encompassed by the watershed boundary.

At the same time, the ESA requires that an area cannot be designated as critical habitat unless at the time of listing it in fact contained physical or biological features essential to the conservation of the species. The ESA does not permit an area lacking such features to be designated as critical habitat in the hope that it may over time acquire such features and therefore aid in the conservation of the species.

The watershed-scale aggregation of stream reaches also allowed us to analyze the impacts of designating a ''particular area,'' as required by ESA section 4(b)(2). As a result of watershed processes, many activities occurring in riparian or upland areas and in non-fish-bearing streams may affect the physical or biological features essential to conservation in the occupied stream reaches. The watershed boundary thus describes an area in which Federal activities have the potential to affect critical habitat (Spence *et al.* 1996). Using watershed boundaries for the economic analysis ensured that all potential economic impacts were considered. Section 3(5) defines critical habitat in terms of ''specific areas,'' and section 4(b)(2) requires the agency to consider certain factors before designating ''particular areas.'' In the case of Pacific salmonids, the biology of the species, the characteristics of its habitat, the nature of the impacts and the limited information currently available at finer geographic scales made it appropriate to consider ''specific areas'' and ''particular areas'' as the same unit.

In addition, watersheds are often being used in recovery efforts for West Coast salmon. In its review of the long-term sustainability of Pacific Northwest salmonids, the National Research Council's Committee on Protection and Management of Pacific Northwest Anadromous Salmonids concluded that ''habitat protection must be coordinated at landscape scales appropriate to salmon life histories' and that social structures and institutions ''must be able to operate at the scale of watersheds'' (National Research Council, 1996). Watershed-level analyses are now common throughout the West Coast (Forest Ecosystem Management Assessment Team, 1993; Montgomery *et al.,* 1995; Spence *et al.,* 1996). There are presently more than 400 watershed councils or groups in

Washington, Oregon, and California alone (For the Sake of the Salmon, 2004). Many of these groups operate at a geographic scale of one to several watersheds and are integral parts of larger-scale salmon recovery strategies (Northwest Power Planning Council, 1999; Oregon Plan for Salmon and Watersheds, 2001; Puget Sound Shared Strategy, 2002; CALFED Bay-Delta Program, 2003). Aggregating stream reaches into watersheds allowed us to consider ''specific areas,'' within or outside the geographical area occupied by the species, at a scale that often corresponds well to salmonid population structure and ecological processes.

Occupied estuarine and marine areas were also considered. In previous designations of salmonid critical habitat we did not designate marine areas outside of estuaries and Puget Sound. In the Pacific Ocean, we concluded that there may be essential habitat features, but they did not require special management considerations or protection (see *Physical or Biological Features Essential to the Conservation of the Species* and *Special Management Considerations or Protection* sections below). Several commenters on that previous rule questioned the finding, and we stated that we would revisit the issue (65 FR 7764; February 16, 2000). Since that time we have carefully considered the best available scientific information, and related agency actions, such as the designation of Essential Fish Habitat under the Magnuson-Stevens Fishery Conservation and Management Act.

We now conclude that it is possible to delineate specific estuarine areas in Puget Sound, the Columbia River, and along the Oregon Coast as well as specific nearshore marine areas of Puget Sound that are occupied, contain physical or biological features essential to the conservation of the species, that may require special management considerations or protection (NMFS, 2004a). Estuarine areas are crucial for juvenile salmonids, given their multiple functions as areas for rearing/feeding, freshwater-saltwater acclimation, and migration (Simenstad *et al.,* 1982; Marriott *et al.* 2002). In many areas, especially the Columbia River estuary, these habitats are occupied by multiple ESUs. We are proposing to designate occupied estuarine areas in similar terms to our past designations, as being defined by a line connecting the furthest land points at the estuary mouth.

Nearshore marine areas also provide important habitat for rearing/feeding and migrating salmonids. Puget Sound supports multiple populations of Puget Sound chinook and Hood Canal summer-run chum salmon (Beamish *et al.,* 1998; Washington Department of Fish and Wildlife (WDFW) and Point No Point Treaty Tribes (PNPTT), 2000). As noted in previous rulemaking (65 FR 7764; February 16, 2000), the unique ecological setting of Puget Sound allowed us to focus on defining specific occupied marine areas. As with the freshwater areas described above, in Puget Sound we identified 19 nearshore marine zones (*i.e.,* areas beyond estuary mouths) eligible for designation based on water resource inventory areas defined by the State of Washington (NMFS, 2004a; Washington Department of Ecology, 2004). However, we are considering excluding these areas under Section 4(b)(2) of the ESA based on the conclusion that the benefits of exclusion outweigh the benefits of designating these areas and invite public comment on this issue. We did not identify offshore marine areas of Puget Sound and the Pacific Ocean for reasons described below under *Physical or Biological Features Essential to the Conservation of the Species* and *Special Management Considerations or Protection.* The proposed designation of marine nearshore areas in Puget Sound is restricted to areas contiguous with the shoreline out to a depth no greater than 30 m relative to the mean lower low water. This nearshore area generally coincides with the maximum depth of the photic zone in Puget Sound and contains physical or biological features essential to the conservation of salmonids (Mazer and Shepard, 1962; Bakkala, 1970; Mathews and Senn, 1975; Fraser *et al.,* 1978; Peterman, 1978; Sakuramoto and Yamada, 1980; Martin *et al.,* 1986; Healey, 1982; Bax, 1983; Salo, 1991, as cited in Johnson *et al.,* 1997; WDFW and PNPTT, 2000; Puget Sound Nearshore Ecosystem Restoration Program, 2003; Williams *et al.,* 2003).

For salmonids in marine areas farther offshore, it becomes more difficult to identify specific areas where essential habitat can be found. Links between human activity, habitat conditions and impacts to listed salmonids are less direct in offshore marine areas. Perhaps the closest linkage exists for salmon prey species that are harvested commercially (*e.g.,* Pacific herring) and, therefore, may require special management considerations or protection. However, because salmonids are opportunistic feeders we could not identify ''specific areas'' beyond the nearshore marine zone where these or other essential features are found within this vast geographic area occupied by Pacific salmon. Moreover, prey species move or drift great distances throughout the ocean and would be difficult to link to any ''specific'' areas.

Unoccupied Areas

ESA section 3(5)(A)(ii) defines critical habitat to include ''specific areas outside the geographical area occupied'' if the areas are determined by the Secretary to be ''essential for the conservation of the species.'' NMFS regulations at 50 CFR 424.12(e) emphasize that we ''shall designate as critical habitat areas outside the geographical area presently occupied by a species only when a designation limited to its present range would be inadequate to ensure the conservation of the species.'' With one exception, we are not proposing to designate these stream reaches at this time but are instead soliciting further information. For the Hood Canal summer run chum salmon ESU, we are proposing approximately 8 miles (12.9 km) of unoccupied (but historically utilized) stream reaches determined to be essential for the conservation of this ESU.

Primary Constituent Elements and Physical or Biological Features Essential to the Conservation of the Species

In determining what areas are critical habitat, agency regulations at 50 CFR 424.12(b) require that we must ''consider those physical or biological features that are essential to the conservation of a given species * * *, including space for individual and population growth and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, and rearing of offspring; and habitats that are protected from disturbance or are representative of the historical geographical and ecological distribution of a species.'' The regulations further direct us to ''focus on the principal biological or physical constituent elements * * * that are essential to the conservation of the species,'' and specify that the ''known primary constituent elements shall be listed with the critical habitat description.'' The regulations identify primary constituent elements (PCE) as including, but not limited to: ''roost sites, nesting grounds, spawning sites, feeding sites, seasonal wetland or dryland, water quality or quantity, host species or plant pollinator, geological formation, vegetation type, tide, and specific soil types.'' An occupied area must contain one or more of the PCEs at the time the species is listed to be eligible for

designation as critical habitat; an area lacking a PCE may not be designated in the hope it will acquire one or more PCEs in the future.

NMFS biologists developed a list of PCEs specific to salmon for the ANPR (68 FR 55926; September 29, 2003), based on a decision matrix (NMFS, 1996) that describes general parameters and characteristics of most of the essential features under consideration in this critical habitat designation. We received very few comments specifically addressing PCEs. As a result of biological assessments supporting this proposed rule (*see* Critical Habitat Analytical Review Teams section), we are now proposing slightly revised PCEs.

The ESUs addressed in this proposed rulemaking share many of the same rivers and estuaries and have similar life history characteristics and, therefore, many of the same PCEs. These PCEs include sites essential to support one or more life stages of the ESU (sites for spawning, rearing, migration and foraging). These sites in turn contain physical or biological features essential to the conservation of the ESU (for example, spawning gravels, water quality and quantity, side channels, forage species). Specific types of sites and the features associated with them include:

1. Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development;

2. Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks;

3. Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival;

4. Estuarine areas free of obstruction with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation.

5. Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.

6. Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.

The habitat areas designated in this proposal currently contain PCEs within the acceptable range of values required to support the biological processes for which the species use the habitat. It is important to note that the contribution of the PCEs to the habitat varies by site and biological function, illustrating the interdependence of the habitat elements such that the quality of the elements may vary within a range of acceptable conditions. An area in which a PCE no longer exists because it has been degraded to the point where it no longer functions as a PCE cannot be designated in the hope that its function may be restored in the future.

Special Management Considerations or Protection

An occupied area cannot be designated as critical habitat unless it contains physical and biological features that ''may require special management considerations or protection.'' Agency regulations at 424.02(j) define ''special management considerations or protection'' to mean ''any methods or procedures useful in protecting physical and biological features of the environment for the conservation of listed species.'' Many forms of human activity have the potential to affect the habitat of listed salmon species: (1) Forestry; (2) grazing; (3) agriculture; (4) road building/maintenance; (5) channel modifications/diking; (6) urbanization; (7) sand and gravel mining; (8) mineral mining; (9) dams; (10) irrigation impoundments and withdrawals; (11) river, estuary, and ocean traffic; (12) wetland loss/removal; (13) beaver removal; (14) exotic/invasive species introductions. In addition to these, the harvest of salmonid prey species (e.g., herring, anchovy, and sardines) may present another potential habitat-related management activity (Pacific Fishery Management Council, 1999). In recent years the Federal government and many non-federal landowners have adopted many changes in land and water management practices that are contributing significantly to protecting and restoring the habitat of listed species. Thus, many of the available special management considerations or protections for these areas are already in place, and the need for designating such areas as critical habitat is diminished correspondingly. We request comment on the extent to which particular areas may require special management considerations or protection in light of existing management constraints. The contributions of these management measures are also relevant to the exclusion analysis under section 4(b)(2) of the ESA, and will be considered further in a later section of this notice.

Military Lands

The Sikes Act of 1997 (Sikes Act) (16 U.S.C. 670a) required each military installation that includes land and water suitable for the conservation and management of natural resources to complete, by November 17, 2001, an Integrated Natural Resource Management Plan (INRMP). An INRMP integrates implementation of the military mission of the installation with stewardship of the natural resources found there. Each INRMP includes: An assessment of the ecological needs on the installation, including the need to provide for the conservation of listed species; a statement of goals and priorities; a detailed description of management actions to be implemented to provide for these ecological needs; and a monitoring and adaptive management plan. Among other things, each INRMP must, to the extent appropriate and applicable, provide for fish and wildlife management, fish and wildlife habitat enhancement or modification, wetland protection, enhancement, and restoration where necessary to support fish and wildlife and enforcement of applicable natural resource laws.

The recent National Defense Authorization Act for Fiscal Year 2004 (Public Law No. 108–136) amended the ESA to limit areas eligible for designation as critical habitat. Specifically, section 4(a)(3)(B)(i) of the ESA (16 U.S.C. 1533(a)(3)(B)(i)) now provides: ''The Secretary shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan prepared under section 101 of the Sikes Act (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation.''

To address this new provision we contacted the Department of Defense and requested information on all INRMPs that might benefit Pacific salmon. (In response to the ANPR (68 FR 55926, September 29, 2003) we had already received a letter from the U.S. Marine Corps regarding this and other issues associated with a possible critical habitat designation on its facilities in the range of the Southern California *O. mykiss* ESU, which is not addressed in this notice). The military services identified 16 installations in Washington, Oregon, and Idaho with INRMPs in place or under development. We determined that the following 11 facilities with INRMPs overlap with habitat areas under consideration for critical habitat designation: (1) Naval Submarine Base, Bangor; (2) Naval Undersea Warfare Center, Keyport; (3) Naval Ordinance Center, Port Hadlock (Indian Island); (4) Naval Radio Station, Jim Creek; (5) Naval Fuel Depot, Manchester; (6) Naval Air Station, Whidbey Island; (7) Naval Air Station, Everett; (8) Bremerton Naval Hospital; (9) Fort Lewis (Army); (10) Pier 23 (Army); and (11) Yakima Training Center (Army). The first ten facilities are located within the range of the Puget Sound chinook salmon ESU, and two of these sites—Bangor and Port Hadlock (Indian Island)—are also within the range of the Hood Canal summer-run chum salmon ESU. The Army's Yakima Training Center is located within the range of the Upper Columbia River *O. mykiss* ESU. All of these INRMPs are final except for Pier 23 and Bremerton Naval Hospital, which should be finalized in the near term.

We identified habitat of value to listed salmonids in each INRMP and reviewed these plans, as well as other information available regarding the management of these military lands. Our preliminary review indicates that each of these INRMPs addresses habitat for salmonids, and all contain measures that provide benefits to ESA-listed salmon and steelhead (NMFS, 2004b). Examples of the types of benefits include actions that control erosion, protect riparian zones, minimize stormwater and construction impacts, reduce contaminants, and monitor listed species and their habitats. Also, we have received information from the DOD identifying national security impacts at all of their affected sites if designated as critical habitat (see Impacts on National Security section). Our consideration of such impacts is separate from our assessment of INRMPs, but the result is that we are not proposing to designate critical habitat in areas subject to the final INRMPs or the draft INRMPs for Pier 23 and for the Bremerton Naval Hospital.

Critical Habitat Analytical Review Teams

To assist in the designation of critical habitat, we convened several Critical Habitat Analytical Review Teams (Teams) organized by major geographic domains that roughly correspond to salmon recovery planning domains. The Teams consisted of Federal salmonid biologists (from NMFS and other federal natural resource agencies) with demonstrated expertise regarding salmonid habitat within the domain and habitat specialists. The Teams were tasked with assessing biological information pertaining to areas under consideration for designation as critical habitat.

The Teams examined each habitat area within the watershed to determine whether the stream reaches or lakes occupied by the species contain the physical or biological features essential to conservation. The Teams also relied on their experience conducting section 7 consultations to determine whether there are management activities in the area that threaten the currently-existing primary constituent elements identified for the species. Where such activities occur, the Teams concluded that there were ''any methods or procedures useful in protecting physical and biological features'' for the area (50 CFR 424.02(j)) and therefore that the features ''may require special management considerations or protection.''

However, the Teams were not asked to evaluate the effects of existing management protections on the species, or analyze the usefulness of protective methods or procedures in addressing risks to PCEs. Thus, the Teams' evaluations do not reflect the extent to which an area will contribute to conservation of the species in the absence of a critical habitat designation.

In addition to occupied areas, the definition of critical habitat also includes unoccupied areas if we determine the area is essential for conservation. Accordingly, the Teams were next asked whether there were any unoccupied areas within the historical range of the ESUs that may be essential for conservation. Where information was currently available to make this determination, the Teams identified those currently unoccupied areas essential for conservation (*i.e.* in Hood Canal summer chum ESU). In most cases, the Teams did not have information available that would allow them to draw that conclusion. The Teams nevertheless identified areas they believe may be determined essential through future recovery planning efforts. These are identified under the Species Descriptions and Area Assessments section, and we are specifically requesting information regarding such areas under Public Comments Solicited.

The Teams were next asked to determine the relative conservation value of each area for each ESU. The Teams scored each habitat area based on several factors related to the quantity and quality of the physical and biological features. They next considered each area in relation to other areas and with respect to the population occupying that area. Based on a consideration of the raw scores for each area, and a consideration of that area's contribution in relation to other areas and in relation to the overall population structure of the ESU, the Teams rated each habitat area as having a ''high,'' ''medium'' or ''low'' conservation value.

The rating of habitat areas as having a high, medium or low conservation value provided information useful for the discretionary balancing consideration in ESA section 4(b)(2). The higher the conservation value for an area, the greater may be the likely benefit of the ESA section 7 protections. The correlation is not perfect because the Teams did not take the additional step of separately considering two factors: how likely are section 7 consultations in an area (that is, how strong is the ''Federal nexus''), and how much protection would exist in the absence of a section 7 consultation (that is, how protective are existing management measures and would they likely continue in the absence of section 7 requirements). We considered the Teams' ratings one useful measure of the ''benefit of designating a particular area as critical habitat'' as contemplated in section 4(b)(2). We are soliciting public comment on approaches that would better refine this assessment.

As discussed earlier, the scale chosen for the ''specific area'' referred to in section 3(5)(a) was a watershed, as delineated by the USGS. There were some complications with this delineation that required us to adapt the approach for some areas. In particular, a large stream or river might serve as a rearing and migration corridor to and from many watersheds, yet be embedded itself in a watershed. In any given watershed through which it passes, the stream may have a few or several tributaries. For rearing/migration corridors embedded in a watershed, the Teams were asked to rate the conservation value of the watershed based on the tributary habitat. We

assigned the rearing/migration corridor the rating of the highest-rated watershed for which it served as a rearing/migration corridor. The reason for this treatment of migration corridors is the role they play in the salmon's life cycle. Salmon are anadromous—born in fresh water, migrating to salt water to feed and grow, and returning to fresh water to spawn. Without a rearing/migration corridor to and from the sea, salmon cannot complete their life cycle. It would be illogical to consider a spawning and rearing area as having a particular conservation value and not consider the associated rearing/migration corridor as having a similar conservation value.

Most of the preliminary Team findings were sent to state and tribal comanagers for review and comment; findings for the Oregon Coast coho salmon ESU were not submitted for comanager review due to time constraints (see Previous Federal Rulemaking section). These comanager reviews resulted in several changes to the Teams' preliminary assessments (e.g., revised fish distribution as well as conservation value ratings) and helped to ensure that the Teams' revised findings (NMFS, 2004a) incorporated the best available scientific data. These revised preliminary assessments, along with this proposed rulemaking, will once again be made available to these comanagers, as well as the general public and peer reviewers, during the public comment period leading up to the final rule. The Teams will be reconvened to review the comments and any new information that might bear on their assessments before we publish final critical habitat designations.

Lateral Extent of Critical Habitat

In past designations we have described the lateral extent of critical habitat in various ways ranging from fixed distances to ''functional'' zones defined by important riparian functions (65 FR 7764, February 16, 2000). Both approaches presented difficulties, and this was highlighted in several comments (most of which requested that we focus on aquatic areas only) received in response to the ANPR (68 FR 55926; September 29, 2003). Designating a set riparian zone width will (in some places) accurately reflect the distance from the stream on which PCEs might be found, but in other cases may over- or understate the distance. Designating a functional buffer avoids that problem, but makes it difficult for Federal agencies to know in advance what areas are critical habitat. To address these issues we are proposing to define the lateral extent of designated critical habitat as the width of the stream channel defined by the ordinary high-water line as defined by the U.S. Army Corps of Engineers (Corps) in 33 CFR 329.11. In areas for which ordinary high-water has not been defined pursuant to 33 CFR 329.11, the width of the stream channel shall be defined by its bankfull elevation. Bankfull elevation is the level at which water begins to leave the channel and move into the floodplain (Rosgen, 1996) and is reached at a discharge which generally has a recurrence interval of 1 to 2 years on the annual flood series (Leopold *et al.,* 1992). Such an interval is commensurate with nearly all of the juvenile freshwater life phases of most salmon and *O. mykiss* ESUs. Therefore, it is reasonable to assert that for an occupied stream reach this lateral extent is regularly ''occupied''. Moreover, the bankfull elevation can be readily discerned for a variety of stream reaches and stream types using recognizable water lines (e.g., marks on rocks) or vegetation boundaries (Rosgen, 1996).

As underscored in previous critical habitat designations, the quality of aquatic habitat within stream channels is intrinsically related to the adjacent riparian zones and floodplain, to surrounding wetlands and uplands, and to non-fish-bearing streams above occupied stream reaches. Human activities that occur outside the stream can modify or destroy physical and biological features of the stream. In addition, human activities that occur within and adjacent to reaches upstream (e.g., road failures) or downstream (e.g., dams) of designated stream reaches can also have demonstrable effects on physical and biological features of designated reaches.

In the relatively few cases where we are proposing to designate lake habitats (e.g., Lake Ozette), we believe that the lateral extent may best be defined as the perimeter of the water body as displayed on standard 1:24,000 scale topographic maps or the elevation of ordinary high water, whichever is greater. In estuarine and nearshore marine areas we believe that extreme high water is the best descriptor of lateral extent. For nearshore marine areas we focused particular attention on the geographical area occupied by the Puget Sound ESUs (chinook and Hood Canal summer-run chum salmon) because of the unique ecological setting and well-documented importance of the area's nearshore habitats to these species (*see* the *Geographical Area Occupied by the Species and Specific Areas within the Geographical Area* section). We are proposing the area inundated by extreme high tide because it encompasses habitat areas typically inundated and regularly occupied during the spring and summer when juvenile salmon are migrating in the nearshore zone and relying heavily on forage, cover, and refuge qualities provided by these occupied habitats. However, it may be more appropriate to use the ordinary high water level in estuarine and nearshore marine areas and we request comment on this issue. As noted above for stream habitat areas, human activities that occur outside the area inundated by extreme or ordinary high water can modify or destroy physical and biological features of the nearshore habitat areas, and Federal agencies must be aware of these important habitat linkages as well.

Species Descriptions and Area Assessments

This section provides descriptions of the 13 subject Pacific salmon and *O. mykiss* ESUs noting specific life-history traits and associated habitat requirements, and summarizes the Teams' assessment of habitat areas for each ESU. The Teams' assessments addressed PCEs in the habitat areas within watersheds (as well as rearing/migration corridors and nearshore zones for some ESUs). For ease of reporting and reference these watersheds have been organized into ''units'' based on their associated subbasin. Similarly, we assigned units to (1) distinct corridors outside the spawning range of several Columbia River Basin ESUs and (2) nearshore zones assessed for two Puget Sound ESUs.

Puget Sound Chinook Salmon ESU

The Puget Sound chinook ESU includes all naturally spawned populations of chinook salmon from rivers and streams flowing into Puget Sound including the Strait of Juan De Fuca from the Elwha River, westward, including rivers and streams flowing into Hood Canal, South Sound, North Sound and the Strait of Georgia in Washington (64 FR 14208; March 24, 1999). We have proposed that 22 artificial propagation (*i.e.,* hatchery) programs also be considered to be part of the ESU (69 FR 33101; June 14, 2004)): the Kendal Creek Hatchery, Marblemount Hatchery (fall, spring yearlings, spring subyearlings, and summer run), Harvey Creek Hatchery, Whitehorse Springs Pond, Wallace River Hatchery (yearlings and subyearlings), Tulalip Bay, Soos Creek Hatchery, Icy Creek Hatchery, Keta Creek Hatchery, White River Hatchery, White Acclimation Pond, Hupp Springs Hatchery, Voights Creek Hatchery, Diru Creek, Clear Creek, Kalama Creek,

Dungeness/Hurd Creek Hatchery, and Elwha Channel Hatchery Chinook hatchery programs.

The Puget Sound chinook ESU includes genetically similar spring-, summer-, and fall-run chinook populations that overlap substantially in their migration and spawn timing (Myers *et al.,* 1998). A Technical Recovery Team (TRT) has been formed to assist recovery planning efforts in the Puget Sound domain. The Puget Sound TRT has released several recent technical reports describing independent populations of chinook salmon in Puget Sound (Ruckelshaus *et al.,* 2001, 2002, 2004). To date the Puget Sound TRT has identified 22 independent chinook populations: the North Fork Nooksack River, South Fork Nooksack River, Lower Skagit River, Upper Skagit River, Lower Sauk River, Suiattle River, Upper Sauk River, Cascade River, North Fork Stillaguamish River, South Fork Stillaguamish River, Skykomish River, Snoqualmie River, North Lake Washington, Cedar River, Green/Duwamish River, Puyallup River, White River, Nisqually River, Skokomish River, Mid-Hood Canal, Dungeness River, and Elwha River. Some naturally spawning aggregations of chinook were not recognized as part of these populations (e.g., the Deschutes River in South Puget Sound). The TRT has concluded that chinook salmon using smaller streams in south and central Puget Sound probably did not occur there in large numbers historically and were not independent populations. It is not clear whether these smaller streams are occupied due to recent hatchery releases or whether historically they supported small satellite ''sink'' populations that were dependent on larger independent ''source'' populations (Ruckelshaus *et al.,* 2002; B. Graeber, NMFS, personal communication). The Puget Sound TRT has identified five ''geographic regions of diversity and correlated risk'' in Puget Sound that are intended to assist in evaluating the need for a geographical distribution of viable populations across the range of such regions in an ESU (Ruckelshaus *et al.,* 2002). The regions are based on similarities in hydrographic, biogeographic, geologic, and catastrophic risk characteristics and where groups of populations have evolved in common (Ruckelshaus *et al.,* 2002). The Puget Sound chinook salmon ESU occupies all of these regions.

Adult spring-run chinook salmon in the Puget Sound typically return to freshwater in April and May and spawn in August and September (Orrell, 1976; WDFW *et al.,* 1993). Adults migrate to the upper portions of their respective river systems and hold in pools until they mature. In contrast, summer-run fish begin their freshwater migration in June and July and spawn in September, while summer/fall-run chinook salmon begin to return in August and spawn from late September through January (WDF *et al.,* 1993). In rivers with an overlap in spawning time, temporal runs on the same river system maintain a certain amount of reproductive isolation through geographic separation.

The majority of Puget Sound fish emigrate to the ocean as subyearlings. Many of the rivers have well-developed estuaries that are important rearing areas for emigrating ocean-type smolts. In contrast, the Suiattle and South Fork Nooksack Rivers have been characterized as producing a majority of yearling smolts (Marshall *et al.,* 1995). Glacially influenced conditions on the Suiattle River may be responsible for limiting juvenile growth, delaying smolting, and producing a higher proportion of 4- and 5-year-old spawners compared to other Puget Sound chinook stocks which mature predominantly as 3- and 4-year-olds. Based on Coded Wire Tag (CWT) recoveries in ocean fisheries, Puget Sound chinook stocks exhibit similar marine distributions in Canadian coastal and Puget Sound waters.

Myers *et al.* (1998) also noted that anthropogenic activities have limited the access to historical spawning grounds and altered downstream flow and thermal conditions. Water diversion and hydroelectric dams have prevented access to portions of several rivers. Watershed development and activities throughout the Puget Sound, Hood Canal, and Strait of Juan de Fuca regions have resulted in increased sedimentation, higher water temperatures, decreased large woody debris recruitment, decreased gravel recruitment, a reduction in river pools and spawning areas, and a loss of estuarine rearing areas (Bishop and Morgan, 1996). These impacts on the spawning and rearing environment may also have altered the expression of many life-history traits, and masked or exaggerated the phenotypic distinctiveness of many stocks. Nevertheless, PCEs exist under current conditions in these areas today and therefore, as explained earlier, NMFS is proposing to designate these areas as critical habitat.

Juvenile chinook salmon in freshwater feed on a variety of terrestrial and aquatic insects and crustaceans, while subadults feed on similar items as well as larger prey including fishes, shrimp, and squid (Scott and Crossman, 1973). One study noted that adults in marine waters forage on a large array of fish species, especially herring and sand lance (Pritchard and Tester, 1944, as cited in Scott and Crossman, 1973).

The Puget Sound Team's assessment for this ESU addressed habitat areas within 61 occupied watersheds in 18 associated subbasins (identified below as ''units'' with unique HUC4 numbers) as well as the nearshore marine area. As part of its assessment, the Team considered the conservation value of each habitat area in the context of the productivity, spatial distribution, and diversity of habitats across the range of the five geographical regions of correlated risk identified by the Puget Sound TRT. The Puget Sound Team evaluated the conservation value of habitat areas on the basis of the physical and biological habitat requirements of Puget Sound chinook salmon, consistent with the PCEs identified for Pacific salmon and *O. mykiss* described under Methods and Criteria Used to Identify Proposed Critical Habitat.

Unit 1. Strait of Georgia Subbasin (HUC4# 17110002)

This subbasin contains three occupied watersheds encompassing approximately 428 sq mi (1,109 sq km). Fish distribution and habitat use data from WDFW identify approximately 71 mi (114.3 km) of occupied riverine/estuarine habitat in the watersheds (WDFW, 2003). However, Ruckelshaus *et al.* (2001, 2004) did not identify any historically independent populations in this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications/diking, forestry, irrigation impoundments and withdrawals, and urbanization. Of the three watersheds reviewed by the Team, habitat areas in all were rated as having low conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 2. Nooksack Subbasin (HUC4# 17110004)

This subbasin contains five occupied watersheds encompassing approximately 795 sq mi (2,059 sq km). Fish distribution and habitat use data from WDFW identify approximately 256 mi (412 km) of occupied riverine/estuarine habitat in the watersheds (WDFW, 2003). Ruckelshaus *et al.* (2001, 2004) identified two historically independent populations in this subbasin: North Fork Nooksack River

and South Fork Nooksack River. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications/diking, forestry, irrigation impoundments and withdrawals, and roadbuilding. Of the five watersheds reviewed by the Team, habitat areas in four were rated as having high and in one were rated as having medium conservation value to the ESU (NMFS, 2004). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 3. Upper Skagit Subbasin (HUC4# 17110005)

This subbasin contains eight watersheds, five of which are occupied and encompass approximately 999 sq mi (2,587 sq km). Fish distribution and habitat use data from WDFW identify approximately 105 mi (169 km) of occupied riverine/estuarine habitat in the watersheds (WDFW, 2003). Ruckelshaus *et al.* (2001, 2004) identified six historically independent populations in this subbasin: Lower Skagit River, Upper Skagit River, Cascade River, Lower Sauk River, Suiattle River, and Upper Sauk River. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including dams, forestry, and roadbuilding. The Team also concluded that habitat areas in four of the occupied watersheds in this subbasin warrant a high rating and those in one warrant a medium rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 4. Sauk Subbasin (HUC4# 17110006)

This subbasin contains four occupied watersheds encompassing approximately 741 sq mi (1,919.2 sq km). Fish distribution and habitat use data from WDFW identify approximately 118 mi (189.9 km) of occupied riverine/estuarine habitat in the watersheds (WDFW, 2003). Ruckelshaus *et al.* (2001, 2004) identified three historically independent populations in this subbasin: Lower Sauk River, Suiattle River, and Upper Sauk River. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including forestry and roadbuilding. Of the four watersheds reviewed by the Team, habitat areas in all were rated as having high conservation value to the ESU (NMFS 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 5. Lower Skagit Subbasin (HUC4# 17110007)

This subbasin contains two occupied watersheds encompassing approximately 447 sq mi (1,157.7 sq km). Fish distribution and habitat use data from WDFW identify approximately 149 mi (239.8 km) of occupied riverine/estuarine habitat in the watersheds (WDFW, 2003). Ruckelshaus *et al.* (2001, 2004) identified six historically independent populations in this subbasin: Lower Skagit River, Upper Skagit River, Cascade River, Lower Sauk River, Suiattle River, and Upper Sauk River. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications/diking, forestry, wetland loss/removal, and urbanization. Of the two watersheds reviewed by the Team, habitat areas in both were rated as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 6. Stillaguamish Subbasin (HUC4# 17110008)

This subbasin contains three occupied watersheds encompassing approximately 704 sq mi (1,823.3 sq km). Fish distribution and habitat use data from WDFW identify approximately 132 mi (212.4 km) of occupied riverine/estuarine habitat in the watersheds (WDFW, 2003). Ruckelshaus *et al.* (2001, 2004) identified two historically independent populations in this subbasin: North Fork Stillaguamish River and South Fork Stillaguamish River. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including forestry, roadbuilding, urbanization, and wetland loss/removal. Of the three watersheds reviewed by the Team, habitat areas in all were rated as having high conservation value to the ESU (NMFS, 2004). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 7. Skykomish Subbasin (HUC4# 17110009)

This subbasin contains five occupied watersheds encompassing approximately 853 sq mi (2,209.3 sq km). Fish distribution and habitat use data from WDFW identify approximately 153 mi (246.2 km) of occupied riverine/estuarine habitat in the watersheds (WDFW, 2003). Ruckelshaus *et al.* (2001, 2004) identified one historically independent population (Skykomish River) in this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications/diking, forestry, irrigation impoundments and withdrawals, and roadbuilding. Of the five watersheds reviewed by the Team, habitat areas in all were rated as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 8. Snoqualmie Subbasin (HUC4# 17110010)

This subbasin contains four watersheds, two of which are occupied and encompass approximately 504 sq mi (1,305.3 sq km). Fish distribution and habitat use data from WDFW identify approximately 90 mi (144.8 km) of occupied riverine/estuarine habitat in the watersheds (WDFW, 2003). Ruckelshaus *et al.* (2001, 2004) identified one historically independent population (Snoqualmie River) in this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture and forestry. Of the two watersheds reviewed by the Team, habitat areas in both were rated as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 9. Snohomish Subbasin (HUC4# 17110011)

This subbasin contains two occupied watersheds encompassing approximately 278 sq mi (720 sq km). Fish distribution and habitat use data from WDFW identify approximately 101 mi (162.5 km) of occupied riverine/estuarine habitat in the watersheds

(WDFW, 2003). Ruckelshaus *et al.* (2001, 2004) identified two historically independent populations in this subbasin: Skykomish River and Snoqualmie River. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications/diking, dams, forestry, and urbanization. Of the two watersheds reviewed by the Team, habitat areas in one were rated as having high and those in the other were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 10. Lake Washington Subbasin (HUC4# 17110012)

This subbasin contains four occupied watersheds encompassing approximately 619 sq mi (1,603.2 sq km). Fish distribution and habitat use data from WDFW identify approximately 190 mi (307.4 km) of occupied riverine/estuarine habitat in these watersheds. Lake Washington contains approximately 40 sq mi (103.6 sq km) of lake habitat in these watersheds and the Team identified three additional small tributaries to the southern portion of the lake that are important rearing habitat for this ESU (Tabor *et al*., 2002). Ruckelshaus *et al.* (2001, 2004) identified two historically independent populations in this subbasin: North Lake Washington and Cedar River. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including channel modifications/diking, dams, forestry, irrigation impoundments and withdrawals, and urbanization. Of the four watersheds reviewed by the Team, habitat areas in one were rated as having high and those in three were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 11. Duwamish Subbasin (HUC4# 17110013)

This subbasin contains three occupied watersheds encompassing approximately 487 sq mi (1,261.3 sq km). Fish distribution and habitat use data from WDFW identify approximately 171 mi (275.2 km) of occupied riverine/estuarine habitat in the watersheds (WDFW, 2003). Ruckelshaus *et al.* (2001, 2004) identified one historically independent population (Green/Duwamish River) in this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications/diking, dams, forestry, irrigation impoundments and withdrawals, and urbanization. Of the three watersheds reviewed by the Team, habitat areas in two were rated as having high and those in one were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 12. Puyallup Subbasin (HUC4# 17110014)

This subbasin contains five watersheds occupied by this ESU, and these watersheds encompass approximately 996 sq mi (256.4 sq km). Fish distribution and habitat use data from WDFW identify approximately 243 mi (391.1 km) of occupied riverine/estuarine habitat in the watersheds (WDFW, 2003). Ruckelshaus *et al.* (2001, 2004) identified two historically independent populations in this subbasin: Puyallup River and White River. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications/diking, dams, forestry, irrigation impoundments and withdrawals, urbanization. Of the five watersheds reviewed by the Team, habitat areas in all were rated as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 13. Nisqually Subbasin (HUC4# 17110015)

This subbasin contains three watersheds, two of which are occupied by this ESU and encompass approximately 472 sq mi (1,222.5 sq km). Fish distribution and habitat use data from WDFW identify approximately 82 mi (132.0 km) of occupied riverine/estuarine habitat in the watersheds (WDFW, 2003). Ruckelshaus *et al.* (2001, 2004) identified one historically independent population (Nisqually River) in this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, dams, and urbanization. Of the two watersheds reviewed by the Team, habitat areas in both were rated as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 14. Deschutes Subbasin (HUC4# 17110016)

This subbasin contains two occupied watersheds occupied encompassing approximately 168 sq mi (435.1 sq km). Fish distribution and habitat use data from WDFW identify approximately 53 mi (85.3 km) of occupied riverine/estuarine habitat in the watersheds (WDFW, 2003). However, Ruckelshaus *et al.* (2001, 2004) did not identify any historically independent populations in this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, forestry, and grazing. Of the two watersheds reviewed by the Team, habitat areas in both were rated as having low conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 15. Skokomish Subbasin (HUC4# 17110017)

This subbasin contains a single watershed encompassing approximately 248 sq mi (642.3 sq km). The Skokomish River population is the only historically independent population documented in this subbasin/watershed by Ruckelshaus *et al.* (2001, 2004). Fish distribution and habitat use data from WDFW identify approximately 72 mi (115.9 km) of occupied riverine/estuarine habitat in the watershed (WDFW, 2003). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including channel modifications/diking, dams, forestry, and urbanization. The Team also concluded that habitat areas in this watershed warrant a high rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 16. Hood Canal Subbasin (HUC4# 17110018)

This subbasin contains six occupied watersheds occupied encompassing approximately 605 sq mi (1,567sq km). Fish distribution and habitat use data from WDFW identify approximately 59 mi (95.0 km) of occupied riverine/estuarine habitat in the watersheds (WDFW, 2003). The Mid-Hood Canal population is the only historically independent population documented in this subbasin by Ruckelshaus *et al.* (2004). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications/diking, forestry, roadbuilding, and urbanization. Of the six watersheds reviewed by the Team, habitat areas in two were rated as having high, those in one were rated as having medium, and those in three were rated as having low conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 17. Kitsap Subbasin (HUC4# 17110019)

This subbasin contains four occupied watersheds encompassing approximately 721 sq mi (1,867 sq km). Fish distribution and habitat use data from WDFW identify approximately 56 mi (90.1 km) of occupied riverine/estuarine habitat in the watersheds (WDFW, 2003). However, Ruckelshaus *et al.* (2001, 2004) did not identify any historically independent populations in this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, forestry, grazing, and urbanization. Of the four watersheds reviewed by the Team, habitat areas in all were rated as having low conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 18. Dungeness/Elwha Subbasin (HUC4# 17110020)

This subbasin contains five watersheds, three of which are occupied, and encompass approximately 695 sq mi (1,800 sq km). Ruckelshaus *et al.* (2001, 2004) identified two historically independent populations in this subbasin: Dungeness River and Elwha River. Chinook salmon in the Port Angeles Harbor watershed are not currently assigned to a historically independent population for this ESU. Fish distribution and habitat use data from WDFW identify approximately 47 mi (75.6 km) of occupied riverine/estuarine habitat in the watersheds (WDFW, 2003). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including channel modifications/diking, forestry, irrigation impoundments and withdrawals, roadbuilding, and urbanization. Of the three watersheds reviewed by the Team, habitat areas in two were rated as having high and those in one were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 19. Nearshore Marine Areas

The nearshore marine area considered by the Team includes that zone from extreme high water out to a depth of 30 meters and adjacent to watersheds occupied by the ESU (described above). The Team assessment focused on this area because it generally encompasses photic zone habitats supporting plant cover (e.g., eelgrass and kelp) important for rearing, migrating, and maturing chinook salmon and their prey. Also, PCEs that may require special management considerations or protection are more readily identified in this zone (e.g., destruction of vegetative cover due to docks and bulkheads). Deeper waters are occupied by subadult and maturing fish, but it is unclear if these areas contain PCEs that require special management considerations or protection. The Team concluded that habitat areas in all nearshore zones of Puget Sound (including areas adjacent to islands), Hood Canal, and the Strait of Juan de Fuca (to the mouth of the Elwha River) warrant a high rating for conservation value to the ESU (NMFS, 2004a). These habitat areas are found along approximately 2,376 miles (3,824 km) of shoreline within the range of this ESU.

Lower Columbia River Chinook Salmon ESU

The Lower Columbia River chinook ESU includes all naturally spawned populations of chinook salmon from the Columbia River and its tributaries from its mouth at the Pacific Ocean upstream to a transitional point between Washington and Oregon east of the Hood River and the White Salmon River, and includes the Willamette River to Willamette Falls, Oregon, exclusive of spring-run chinook salmon in the Clackamas River (64 FR 14208; March 24, 1999). We have proposed that 17 artificial propagation programs also be considered part of the ESU (69 FR 33101; June 14, 2004): the Sea Resources Tule Chinook Program, Big Creek Tule Chinook Program, Astoria High School (STEP) Tule Chinook Program, Warrenton High School (STEP) Tule Chinook Program, Elochoman River Tule Chinook Program, Cowlitz Tule Chinook Program, North Fork Toutle Tule Chinook Program, Kalama Tule Chinook Program, Washougal River Tule Chinook Program, Spring Creek NFH Tule Chinook Program, Cowlitz Spring Chinook Program in the Upper Cowlitz River and the Cispus River, Friends of the Cowlitz Spring Chinook Program, Kalama River Spring Chinook Program, Lewis River Spring Chinook Program, Fish First Spring Chinook Program, and the Sandy River Hatchery (Oregon Department of Fish and Wildlife (ODFW) stock #11) Chinook hatchery programs.

Myers *et al.* (2003) identified 31 historical demographically independent chinook salmon populations in this ESU consisting of three life history types (spring-, fall-, and late fall-run). It is estimated that 8 to 10 historical populations in the ESU have been extirpated or nearly so. The Willamette/Lower Columbia TRT has placed groups of populations in this recovery planning domain into ''strata'' (McElhany *et al.*, 2002). The strata are based on major life-history characteristics (*e.g.*, species run-types) and ecological zones. The Lower Columbia River chinook ESU inhabits three ecological zones (Coast Range, Cascade, and Columbia Gorge) and contains three life-history types (spring-, fall-, and late-fall run chinook salmon), resulting in six strata for this ESU: Coast range fall-run populations; Cascade spring-, fall-, and late fall-run populations; and Columbia Gorge spring- and fall-run populations (McElhany *et al.*, 2002). Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of such strata in the ESU (Ruckelshaus *et al.*, 2002; McElhany *et al.*, 2003).

Of the Pacific salmon, chinook salmon exhibit the most diverse and complex life history strategies. Chinook salmon follow one of two general freshwater cycles: stream or ocean type. After emerging from the gravel, stream-type chinook salmon reside in fresh water for a year or more before migrating to the ocean. Ocean-type chinook salmon migrate to the ocean within their first year. These two types

of chinook salmon have different life history traits, geographic distribution, and genetic characteristics. Chinook in the lower Columbia River generally follow an ocean-type life history cycle.

Runs are designated on the basis of when adults enter freshwater; however, distinct runs may also differ in the degree of maturation at river entry and time of spawning. Early, spring-run (stream-maturing) chinook salmon tend to enter freshwater as immature or bright fish, migrate upriver (holding in suitable thermal refuges for several months), and finally spawn in late summer and early autumn. Late, fall-run (ocean maturing) chinook salmon enter freshwater at an advanced stage of maturity, move rapidly to their spawning areas on the main stem or lower tributaries of the rivers, and spawn within a few days or weeks of freshwater entry. Fall chinook dominate chinook salmon runs in the Lower Columbia River chinook ESU. The once abundant natural runs of fall and spring chinook have been largely replaced by hatchery production. Large chinook runs continue to return to many of their natal streams, but there are few sustained, native, naturally reproducing populations.

Adult spring chinook return to the Lower Columbia River at 4 to 5 years of age. They enter the Columbia River in March and April and generally enter natal basins from March through June, well in advance of spawning in August and September. Spring chinook typically spawn in headwater areas where higher gradient habitat exists. Successful spawning depends on sufficient clean gravel of the right size, in addition to the constant need of adequate flows and water quality. Fall chinook return to the Columbia River at 3 to 4 years of age, although 5-year olds are common in some populations. They enter fresh water from August to September and spawning generally occurs from late September to November, with peak spawning activity in mid-October. Bright fall Chinook adults enter the Columbia River August to October; dominant age class varies by population and brood year, but is typically age 4. Spawning occurs in November to January, with peak spawning in mid November.

Chinook salmon eggs incubate throughout the autumn and winter months. As with other salmonids, water temperature controls incubation time and affects survival. During incubation, clean, well-oxygenated water flow is critical. Floods and scouring, dewatering, and sedimentation can result in high egg mortality. In the Lower Columbia River, spring chinook fry emerge from the gravel from November through March; peak emergence time is likely December and January. Fall chinook fry generally emerge from the gravel in April, depending on the time of egg deposition and incubation water temperature. The emerging fry migrate quickly to protected waters and off-stream areas where they can find food and refuge from predators and high flows.

After emerging from the gravel in the spring, most fall chinook fry rear in the freshwater habitat for 1 to 4 months before emigrating to the ocean as subyearlings. A few fall chinook remain in fresh water until their second spring and emigrate as yearlings. Conversely, spring chinook emerge from the gravel earlier than fall chinook, generally in the late winter/early spring. Normally, spring chinook spend one full year in fresh water and emigrate to sea in their second spring. After emergence fry generally search for suitable rearing habitat within side sloughs, side channels, spring-fed seep areas, and along the outer edges of the stream. These side margin, off-channel, and slough areas are vital for early juvenile habitat. The presence of woody debris and overhead cover aid in food and nutrient inputs, and provide refuge from predators during early freshwater residence.

Juvenile chinook salmon in freshwater feed on a variety of terrestrial and aquatic insects and crustaceans, while subadults in the ocean feed on similar items as well as larger prey including fishes, shrimp, and squid (Scott and Crossman, 1973). One study noted that adults in marine waters forage on a large array of fish species, especially herring and sand lance (Pritchard and Tester, 1944, as cited in Scott and Crossman, 1973).

The Lower Columbia River Team's assessment for this ESU addressed habitat areas within 47 occupied watersheds in 10 subbasins (identified below as ''units'' with unique HUC4 numbers), as well as the lower Columbia River rearing/migration corridor. As part of its assessment, the Team considered the conservation value of each habitat area in the context of the productivity, spatial distribution, and diversity of habitats across the range of the six life-history type and ecological strata identified by the Willamette/Lower Columbia TRT. The Lower Columbia River Team evaluated the conservation value of habitat areas on the basis of the physical and biological habitat requirements of Lower Columbia River chinook salmon, consistent with the PCEs identified for Pacific salmon and *O. mykiss* described above in the Methods and Criteria Used to Identify Proposed Critical Habitat section.

Unit 1. Middle Columbia/Hood Subbasin (HUC4# 17070105)

This subbasin contains 13 watersheds, 8 of which are occupied by this ESU and encompass approximately 1,370 sq mi (3,548.3 sq km). Fish distribution and habitat use data from ODFW and WDFW identify approximately 145 mi (233.4 km) of occupied riverine habitat in the watersheds, including a 23-mi (37-km) segment of the Columbia River (ODFW, 2003a,b; WDFW, 2003). Myers *et al.* (2003) identified a single ecological zone (Columbia Gorge) containing four fall-run (Lower Gorge tributaries, Upper Gorge tributaries, Big White Salmon River, and Hood River) and two spring-run (Big White Salmon River and Hood River) historical demographically independent populations in this subbasin. The Upper Gorge tributaries fall-run and Big White Salmon fall- and spring-run populations have been classified by the TRT as ''core'' populations (*i.e.*, historically abundant and ''may offer the most likely path to recovery'' (McElhany *et al.*, 2003)). Native spring-run chinook salmon are believed to be extirpated in this subbasin, although efforts are underway to reestablish these fish. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, dams, forestry, and roadbuilding. The Team also concluded that habitat areas in six of the watersheds in this subbasin warrant a high rating and those in two warrant a medium rating for conservation value to the ESU (NMFS, 2004a). The Team noted that two watersheds contain a high value rearing and migration corridor in the Columbia River connecting high value habitat areas upstream with downstream reaches and the ocean. The Team also considered whether blocked historical habitats above Condit Dam (on the White Salmon River) may be essential for conservation of the ESU. The Team determined that accessing this habitat would likely provide a benefit to the ESU, especially for spring-run chinook salmon of which there are only two historical populations in the Gorge region. However, the Team concluded that it was unclear whether the areas above Condit Dam are essential for conservation of the entire ESU, especially in comparison to other, more extensive, historical habitats that may be of greater potential benefit to the ESU (*e.g.*, areas in the Upper Lewis River).

We seek comment on whether these areas should be proposed as critical habitat.

Unit 2. Lower Columbia/Sandy Subbasin (HUC4# 17080001)

This subbasin contains nine occupied watersheds encompassing approximately 1,076 sq mi (2,787 sq km). Fish distribution and habitat use data from ODFW and WDFW identify approximately 217 mi (349.2 km) of occupied riverine habitat in the watersheds, including a 26-mi (41.8-km) segment of the Columbia River (ODFW, 2003a,b; WDFW, 2003). Myers *et al.* (2003) identified two ecological zones (Cascade and Columbia Gorge) containing five fall-run (Lower Gorge tributaries, Sandy River early fall, Sandy River late fall, Washougal River, and Salmon Creek/Lewis River) and one spring-run (Sandy River) historical demographically independent populations in this subbasin. The Sandy River late fall- and spring-run chinook salmon have been classified by the TRT as ''core'' populations (*i.e.*, historically abundant and ''may offer the most likely path to recovery'' (McElhany *et al.* 2003)). Also, the TRT classified the Sandy River spring- and late fall-runs and the Salmon Creek/Lewis River fall-run as genetic legacy populations (*i.e.*, some of ''the most intact representatives of the genetic character of the ESU'' (McElhany *et al.* 2003)). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including channel modifications, dams, forestry, roadbuilding, and urbanization. Of the nine watersheds reviewed by the Team, habitat areas in seven were rated as having high, those in one were rated as having medium, and those in one were rated as having low conservation value to the ESU (NMFS, 2004a). The Team also noted that one watershed contains a high value rearing and migration corridor in the Columbia River connecting high value habitat areas upstream with downstream reaches and the ocean. The Team also concluded that inaccessible reaches above the Bull Run Dam complex in the Bull Run River watershed may be essential to the conservation of the ESU. The Team concluded that these unoccupied areas may be essential for conservation because (1) they once supported TRT core and genetic legacy populations (Sandy River spring- and late fall-runs) and (2) they contain non-inundated habitats that are likely in good to excellent condition (*i.e.*, the watershed provides domestic drinking water for the City of Portland and may have been some of the better spawning areas) (Sieglitz, 2002; McElhany *et al.*, 2003). The Team noted that NMFS'' status review of this ESU stated that habitat loss due to ''extensive hydropower development projects'' posed a serious threat to this ESU (NMFS, 2003). This report also expressed serious concerns associated with dramatic declines in the spring-run life history type (which inhabits this watershed). Therefore, the Team concluded that the ESU would likely benefit if the extant population of spring-run fish had access to spawning/rearing habitat upstream. We seek comment on whether these areas should be proposed as critical habitat.

Unit 3. Lewis Subbasin (HUC4# 17080002)

This subbasin contains six watersheds, two of which are currently occupied by this ESU and the remaining four of which are now blocked by Merwin Dam and others upstream. Occupied watersheds encompass approximately 456 sq mi (1,181 sq km). Fish distribution and habitat use data from WDFW identify approximately 68 mi (109.4 km) of occupied riverine habitat in the watersheds (WDFW, 2003). Myers *et al.* (2003) identified a single ecological zone (Cascade) containing one spring-run (Lewis River), one fall-run (Salmon Creek/Lewis River) and one late fall-run (Lewis River) historical demographically independent populations in this subbasin. The TRT has classified the Lewis River spring- and late fall-run populations as ''core'' populations (historically abundant and ''may offer the most likely path to recovery'') and the Lewis River late fall-run and Salmon Creek/Lewis River fall-run populations as genetic legacy populations (some of ''the most intact representatives of the genetic character of the ESU'') (McElhany *et al.* 2003). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, dams, forestry, and roadbuilding. The Team also concluded that habitat areas in both of the occupied watersheds in this subbasin warrant a high rating for conservation value to the ESU (NMFS, 2004a). The Team also concluded that inaccessible reaches above Merwin, Yale and Swift dams may be essential to the conservation of the ESU. The Team believed that these unoccupied areas may be essential because: (1) They once supported TRT core and genetic legacy populations; and (2) they contain non-inundated habitats that are likely in good condition relative to other more urbanized watersheds in the Cascade region (Lower Columbia River Fish Recovery Board, 2003; McElhany *et al.*, 2003). The Team noted that NMFS' status review of this ESU stated that habitat loss due to ''extensive hydropower development projects'' posed a serious threat to this ESU (NMFS, 2003). This report also expressed serious concerns associated with dramatic declines in the spring-run life history type (which inhabits this watershed). Therefore, the Team concluded that the ESU would likely benefit if the extant population of spring-run fish had access to spawning/rearing habitat upstream. We seek comment on whether these areas should be proposed as critical habitat.

Unit 4. Lower Columbia/Clatskanie Subbasin (HUC4# 17080003)

This subbasin contains six occupied watersheds encompassing approximately 841 sq mi (2,178 sq km). Fish distribution and habitat use data from ODFW and WDFW identify approximately 170 mi (273.6 km) of occupied riverine habitat in the watersheds (ODFW, 2003a,b; WDFW, 2003). Myers *et al.* (2003) identified two ecological zones (Coast Range and Cascade) containing five fall-run (Elochoman River, Mill Creek, Kalama River, Clatskanie River, and Scappoose River) and one spring-run (Kalama River) historical demographically independent populations in this subbasin. The Elochoman River fall-run population has been classified by the TRT as a ''core'' population (*i.e.*, historically abundant and ''may offer the most likely path to recovery'' (McElhany *et al.*, 2003)). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, forestry, roadbuilding, and urbanization. Of the six watersheds reviewed by the Team, habitat areas in two were rated as having high, those in three were rated as having medium, and those in one were rated as having low conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 5. Upper Cowlitz Subbasin (HUC4# 17080004)

This subbasin contains five occupied watersheds encompassing approximately 1,030 sq mi (2,667.7 sq km). Fish distribution and habitat use data from WDFW identify

approximately 104 mi (167.4 km) of occupied riverine habitat in the watersheds (WDFW, 2003). All of this habitat is located upstream of impassable dams (Mayfield and Mossyrock) and only accessible to anadromous fish via trap and haul operations. Myers *et al.* (2003) identified one ecological zone (Cascade) containing one fall-run (Upper Cowlitz River) and two spring-run (Upper Cowlitz River and Cispus River) historical demographically independent populations in this subbasin. Both spring-run populations have been classified by the TRT as ''core'' populations (*i.e.*, historically abundant and ''may offer the most likely path to recovery'' (McElhany *et al.* 2003)). In addition, the TRT classified the Upper Cowlitz River spring-run population as a genetic legacy population (*i.e.*, one of ''the most intact representatives of the genetic character of the ESU.'') However, there are significant uncertainties about the remaining stock structure in this subbasin (Myers *et al.*, 2003). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, forestry, roadbuilding, and urbanization. Of the five watersheds reviewed by the Team, habitat areas in all were rated as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 6. Lower Cowlitz Subbasin (HUC4# 17080005)

This subbasin contains eight occupied watersheds encompassing approximately 1,460 sq mi (3,781.4 sq km). Fish distribution and habitat use data from WDFW identify approximately 350 mi (563.3 km) of occupied riverine habitat in the (WDFW, 2003). Habitat in two watersheds—Tilton River and Riffe Reservoir—is located upstream of impassable dams (Mayfield and Mossyrock) and only accessible to anadromous fish via trap and haul operations. Data from WDFW identified very little chinook salmon distribution in the Riffe Reservoir watershed (and did not identify the Riffe and Mayfield lakes as occupied habitat). However, the Team determined that these lakes are occupied and contain PCEs for rearing/migrating juveniles based on information regarding migrants described in Wade (2000) as well as their own knowledge of trap and haul operations in this subbasin. Myers *et al.* (2003) identified one ecological zone (Cascade) containing four fall-run (Coweeman River, Toutle River, Lower Cowlitz River, and Upper Cowlitz River) and four spring-run (Toutle River, Tilton River, Upper Cowlitz River, and Cispus River) historical demographically independent populations in this subbasin. The latter two spring-run populations as well as the Toutle River and Lower Cowlitz River fall-run populations have been classified by the TRT as ''core'' populations (*i.e.*, historically abundant and ''may offer the most likely path to recovery'' (McElhany *et al.* 2003)). In addition, the TRT classified the Upper Cowlitz River spring-run and Coweeman River fall-run as genetic legacy populations (*i.e.*, some of ''the most intact representatives of the genetic character of the ESU.'') The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, forestry, roadbuilding, and urbanization. Of the eight watersheds reviewed by the Team, habitat areas in four were rated as having high and those in four were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team also noted that four watersheds (Riffe Reservoir, Jackson Prairie, East Willapa, and Coweeman River) contained habitat areas with high value rearing and migration corridors connecting high value habitat areas upstream with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 7. Lower Columbia Subbasin (HUC4# 17080006)

This subbasin contains three occupied watersheds encompassing approximately 515 sq mi (1,334 sq km). Fish distribution and habitat use data from the ODFW and WDFW identify approximately 120 mi (193.1 km) of occupied riverine habitat in the watersheds (ODFW, 2003a,b; WDFW, 2003). Myers *et al.* (2003) identified a single ecological zone (Coast Range) containing three fall-run historical demographically independent populations in this subbasin (Grays River, Youngs Bay, and Big Creek). The Big Creek fall-run population has been classified by the TRT as a ''core'' population (*i.e.*, historically abundant and ''may offer the most likely path to recovery'' (McElhany *et al.* 2003)). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, forestry, roadbuilding, and urbanization. Of the three watersheds reviewed by the Team, habitat areas in two were rated as having high and those in one were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 8. Middle Willamette Subbasin (HUC4# 17090007)

The occupied portion of this subbasin is downstream of Willamette Falls and includes a single watershed (Abernethy Creek) encompassing approximately 134 sq mi (347.0 sq km) as well as a short segment (approximately 1 mile (1.6 km)) of the Willamette River downstream of Willamette Falls. Fish distribution and habitat use data from ODFW identify approximately 3 mi (4.8 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The occupied portions of the subbasin are in the Cascade ecological zone identified by Myers *et al.* (2003), but the TRT did not associate fish in this area with a historical demographically independent population (McElhany *et al.*, 2003). However, the mouth of Abernethy Creek enters the Willamette upstream and in close proximity (less than 0.6 mi (1 km)) to the mouth of the Clackamas River which does contain a fall-run population identified by the TRT. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, dams, roadbuilding, and urbanization. The Team also concluded that habitat areas in the Abernethy Creek watershed are of low conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 9. Clackamas Subbasin (HUC4# 17090011)

This subbasin contains six watersheds, two of which are occupied by this ESU (Lower Clackamas and Eagle Creek) and encompass approximately 270 sq mi (699.3 sq km). Fish distribution and habitat use data from the ODFW identify approximately 54 mi (86.9 km) of occupied riverine habitat in the watersheds (ODFW, 2003a,b). Myers *et al.* (2003) identified a single ecological zone (Cascade)

containing a single historical demographically independent population in this subbasin (Clackamas River fall-run). This fall-run population has been classified by the TRT as a ''core'' population (*i.e.*, historically abundant and ''may offer the most likely path to recovery'' (McElhany *et al.* 2003)). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, forestry, roadbuilding, and urbanization. Of the two watersheds reviewed by the Team, habitat areas in one (Lower Clackamas River) were rated as having high and those in the other (Eagle Creek) were rated as having low conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 10. Lower Willamette Subbasin (HUC4# 17090012)

This subbasin contains three occupied watersheds encompassing approximately 407 sq mi (1,054.1 sq km). Fish distribution and habitat use data from ODFW identify approximately 89 mi (143.2 km) of occupied riverine habitat in the watersheds (ODFW, 2003a,b). Myers *et al.* (2003) identified a single ecological zone (Cascade) containing two fall-run historical demographically independent populations in this subbasin (Clackamas River and Scappoose River). The Clackamas River fall-run population has been classified by the TRT as a ''core'' population (*i.e.*, historically abundant and ''may offer the most likely path to recovery'' (McElhany *et al.* 2003)). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, roadbuilding, urbanization, and wetland loss and removal. Of the three watersheds reviewed by the Team, habitat areas in one were rated as having high and those in two were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 11. Lower Columbia River Corridor

For the purposes of describing units of critical habitat designation for this ESU, we define this corridor as that segment of the Columbia River from the confluences of the Sandy River (Oregon) and Washougal River (Washington) to the Pacific Ocean. Fish distribution and habitat use data from ODFW identify approximately 118 mi (189.9 km) of occupied riverine and estuarine habitat in this corridor (ODFW, 2003a,b). After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the Team concluded that the lower Columbia River corridor was of high conservation value to the ESU. The Team noted that this corridor connects every watershed and population in this ESU with the ocean and is used by rearing/migrating juveniles and migrating adults. The Columbia River estuary is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (Marriott *et al.*, 2002). Management activities that may affect the PCEs in this corridor include channel modifications, roadbuilding, river/estuary traffic, roadbuilding, urbanization, and wetland loss and removal.

Upper Willamette River Chinook Salmon ESU

The Upper Willamette River chinook ESU includes all naturally spawned populations of spring-run chinook salmon in the Clackamas River and in the Willamette River, and its tributaries, above Willamette Falls, Oregon (64 FR 14208; March 24, 1999). We have proposed that seven artificial propagation programs also be considered part of the ESU (69 FR 33101; June 14, 2004): the McKenzie River Hatchery (ODFW stock # 24), Marion Forks/North Fork Santiam River (ODFW stock # 21), South Santiam Hatchery (ODFW stock # 23) in the South Fork Santiam River, South Santiam Hatchery in the Calapooia River, South Santiam Hatchery in the Mollala River, Willamette Hatchery (ODFW stock # 22), and Clackamas hatchery (ODFW stock # 19) spring-run chinook hatchery programs.

Historically, the Willamette River Basin provided sufficient spawning and rearing habitat for large numbers of spring-run chinook salmon. The predominant tributaries to the Willamette River that historically supported spring-run chinook salmon all drain the Cascade Range. The Willamette/Lower Columbia TRT has identified each of these seven drainages as an historically demographically independent population: Clackamas, Molalla, North Santiam, South Santiam, Calapooia, McKenzie, and Middle Fork Willamette rivers. The TRT also noted that reports of ''Chinook salmon in westside tributaries have continued to the present; however it is unlikely the abundance of spawners in any of these tributaries constitutes a [demographically independent population].'' Approximately 30 to 40 percent of total historical habitat is now inaccessible behind dams. These inaccessible areas, however, represent a majority of the historical spawning habitat. This restriction of natural production to just a few areas increases the ESU's vulnerability to environmental variability and catastrophic events. The Willamette/Lower Columbia TRT has identified groups of populations in this recovery planning domain into ''strata'' intended to assist in evaluating ESU-wide recovery scenarios (McElhany *et al.*, 2002). The strata are based on major life-history characteristics (e.g., species run-types) and ecological zones. The upper Willamette River chinook ESU consists of a single stratum as it consists of a single run-type (spring-run fish) that spawns within a single ecological zone (the Willamette River). Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of such strata/regions in an ESU (Ruckelshaus *et al.*, 2002; McElhany *et al.*, 2003).

Spring-run chinook salmon populations in the upper Willamette River basin and Clackamas River have been strongly influenced by extensive transfers of hatchery fish throughout the ESU for nearly 100 years, as well as the introduction of non-native fall-run chinook salmon. Prior to the laddering of Willamette Falls, passage by returning adult salmonids (just upstream of the confluence of the Clackamas and Willamette rivers) was only possible during winter and spring high-flow periods. Low flows during the summer and autumn months prevented fall-run salmon from accessing the upper Willamette River Basin. This isolation has provided the potential for significant local adaptation of Upper Willamette River spring-run chinook relative to other Columbia River populations. The early run-timing of adult Willamette River spring-run chinook salmon relative to other lower Columbia River spring-run populations is viewed as an adaptation to flow conditions at Willamette Falls. In some years fish returning to the upper Willamette River Basin historically may have strayed into the Clackamas River when conditions at Willamette Falls prevented upstream passage. Therefore, similarities between Clackamas River and upper Willamette River spring-run fish may reflect an historical and

evolutionary association between the two groups.

Upper Willamette River chinook salmon begin appearing in the Lower Willamette River in February, but the majority of the run ascends Willamette Falls in April and May, with a peak in mid-May. Currently, the migration of adult spring-run chinook salmon over Willamette Falls extends into July and August. Historically, passage over the falls may have been marginal in June, due to diminishing flows, with only larger fish being able to ascend.

Adults spawn in both mainstem and tributary habitats of eastside drainages to the Willamette River typically from late July to October. The juvenile life-history characteristics of Upper Willamette River spring-run salmon appear to be highly variable. Fry emerge from February to March, although sometimes as late as June. Juveniles appear to emigrate continuously out of the tributaries and into the mainstem Willamette River as fry (late winter to early spring), fingerlings (fall to early winter), and yearlings (late winter to spring). Most juveniles enter the ocean as yearlings after overwintering and rearing in the mainstem Willamette and Columbia rivers. In general, the majority of spring chinook salmon returning to the upper Willamette River basin currently mature at 4 and 5 years old.

The Upper Willamette River Team's assessment for this ESU addressed habitat areas within 56 occupied watersheds in 10 associated subbasins (identified below as ''units'' with unique HUC4 numbers) as well as the lower Willamette/Columbia River rearing/migration corridor. As part of its assessment, the Team considered the conservation value of each habitat area in the context of the productivity, spatial distribution, and diversity of habitats across the range of the single life-history type and ecological stratum identified by the Willamette/Lower Columbia TRT. The Team evaluated the conservation value of habitat areas on the basis of the physical and biological habitat requirements of Upper Willamette River chinook salmon, consistent with the PCEs identified for Pacific salmon and *O. mykiss* described in the Methods and Criteria Used to Identify Proposed Critical Habitat section.

Unit 1. Middle Fork Willamette Subbasin (HUC4# 17090001)

This subbasin contains 10 occupied watersheds encompassing approximately 1,367 sq mi (3,541 sq km). Fish distribution and habitat use data from ODFW identify approximately 273 mi (439.4 km) of occupied riverine habitat in the watersheds (ODFW, 2003a,b). Myers *et al.* (2003) identified one demographically independent population (Middle Fork Willamette River) in this subbasin. The Team concluded that all of these occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, dams, forestry, and roadbuilding. The Team also concluded that habitat areas in four of the watersheds in this subbasin warrant a high rating and those in six warrant a medium rating for conservation value to the ESU (NMFS, 2004a). The Team noted that the habitat areas with medium overall ratings contained a high value rearing and migration corridor connecting high value habitat areas upstream with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 2. Coast Fork Willamette Subbasin (HUC4# 17090002)

This subbasin contains four occupied watersheds encompassing approximately 664 sq mi (1,719.8 sq km). Fish distribution and habitat use data from ODFW identify approximately 44 mi (70.8 km) of occupied riverine habitat in the watersheds (ODFW, 2003a,b). Myers *et al.* (2003) did not identify a demographically independent population in this subbasin, and Kostow (1995) characterized them as extinct. Myers *et al.* (2003) noted that reports of ''Chinook salmon in westside tributaries have continued to the present; however it is unlikely the abundance of spawners in any of these tributaries constitutes a [demographically independent population].'' However, recent data from ODFW (ODFW, 2004a,b) indicate that several watersheds in this subbasin likely contain important rearing and migration PCEs. Therefore, the Team concluded that all of these occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, dams, roadbuilding, and urbanization. The Team also concluded that habitat areas in all four watersheds in this subbasin warrant a low rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 3. Upper Willamette Subbasin (HUC4# 17090003)

This subbasin contains six occupied watersheds encompassing approximately 1,872 sq mi (4,848 sq km). Fish distribution and habitat use data from ODFW identify approximately 225 mi (362.1 km) of occupied riverine habitat in the watersheds (ODFW, 2003a,b). Myers *et al.* (2003) identified possibly four demographically independent populations in this subbasin. Myers *et al.* (2003) also noted that reports of ''Chinook salmon in westside tributaries have continued to the present; however it is unlikely the abundance of spawners in any of these tributaries constitutes a [demographically independent population].'' However, recent data from ODFW (ODFW, 2004a,b) indicate that some watersheds (e.g., Marys and Luckiamute rivers) in this subbasin likely contain important rearing and migration PCEs. Therefore, the Team concluded that all of these occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, forestry, roadbuilding, and urbanization. The Team also concluded that habitat areas in three of the watersheds in this subbasin warrant a medium rating and those in three warrant a low rating for conservation value to the ESU (NMFS, 2004a). The Team also concluded that all reaches of the Willamette River within this subbasin constitute a high value rearing and migration corridor connecting upstream populations (e.g., those in the McKenzie, Middle Fork Willamette, and Calapooia Rivers) and high value habitat areas with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 4. McKenzie River Subbasin (HUC4# 17090004)

This subbasin contains seven occupied watersheds encompassing approximately 1,339 sq mi (3,468 sq km). Fish distribution and habitat use data from ODFW identify approximately 268 mi (431.3 km) of occupied riverine habitat in the watersheds (ODFW, 2003a,b). Myers *et al.* (2003) identified one demographically independent population (McKenzie River) in this subbasin. This is probably the only self-sustaining population above Willamette Falls, and possibly in the entire ESU (Myers *et al.*, 2003; NMFS, 2003). The Team concluded that all of the occupied areas contain spawning, rearing, or

migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, dams, forestry, and roadbuilding. The Team also concluded that habitat areas in five of the watersheds in this subbasin warrant a high rating and those in two warrant a medium rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 5. North Santiam River Subbasin (HUC4# 17090005)

This subbasin contains six watersheds, three of which are occupied and encompass approximately 315 sq mi (815.8 sq km). Fish distribution and habitat use data from ODFW identify approximately 125 mi (201.2 km) of occupied riverine habitat in these watersheds (ODFW, 2003A,B). Myers *et al.* (2003) identified one demographically independent population (North Santiam River) in this subbasin. Historically accessible areas in the three uppermost watersheds of this subbasin are now blocked by Big Cliff and Detroit dams. These dams block access to approximately 70 percent of the historic spawning area in this subbasin (Myers *et al.*, 2003). The Team concluded that all of the occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, dams, forestry, and roadbuilding. The Team also concluded that habitat areas in two of the watersheds in this subbasin warrant a high rating and those in one warrant a medium rating for conservation value to the ESU (NMFS, 2004a). The Team also concluded that the three inaccessible watersheds (Upper North Santiam, North Fork Breitenbush River, and Detroit Reservoir/Blowout Divide Creek) may be essential to the conservation of the ESU. All three watersheds are presently occupied by hatchery chinook salmon which are trapped downstream and released into these watersheds. The Team determined that the Detroit Reservoir/Blowout Divide Creek watershed would have a lower overall conservation value due to the large areas inundated by Detroit Reservoir. The Team concluded that these unoccupied areas may be essential because: (1) They once supported a TRT core population; (2) they contain non-inundated habitats that are still relatively abundant and in fair to good condition and improving; (3) there is evidence that the areas can support significant natural production; and (3) the naturally-reproducing population below Big Cliff Dam has limited spawning PCEs and appears to suffer from high mortality rates (Willamette National Forest [WNF], 1994; WNF, 1995; WNF, 1996; WNF, 1997; Ziller *et al.*, 2002; McElhany *et al.*, 2003). The Team noted that NMFS' status review of this ESU stated ''the declines in spring chinook salmon in the Upper Willamette River ESU can be attributed in large part to the extensive habitat blockages caused by dam construction.'' In addition, the Team also noted that providing passage at dams and diversions has been identified as a key potential conservation measure for Willamette River salmon (Martin *et al.*, 1998; Bastasch *et al.*, 2002). Therefore, the Team determined that access to these areas would likely promote the conservation of the ESU. We seek comment on whether these areas should be proposed as critical habitat.

Unit 6. South Santiam River Subbasin (HUC4# 17090006)

This subbasin contains eight watersheds, six of which are occupied by this ESU and encompass approximately 766 sq mi (1,983.9 sq km). Fish distribution and habitat use data from ODFW identify approximately 169 mi (272 km) of occupied riverine habitat in these watersheds (ODFW, 2003a,b). Two watersheds in the upper Middle Santiam River (Quartzville Creek and Middle Santiam River) are blocked by Green Peter Dam. Myers *et al.* (2003) identified one historically independent population (South Santiam River) in this subbasin. The Team concluded that all of these occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, forestry, and roadbuilding. The Team also concluded that habitat areas in three of the watersheds in this subbasin warrant a high rating and those in three warrant a medium rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 7. Middle Willamette River Subbasin (HUC4# 17090007)

This subbasin consists of four occupied watersheds encompassing approximately 712 sq mi (1,844 sq km). Fish distribution and habitat use data from ODFW identify approximately 158 mi (254.3 km) of occupied riverine habitat (all rearing/migration) in these watersheds (ODFW, 2003a,b). Myers *et al.* (2003) identified only a small portion of the spawning range of one demographically independent population (North Santiam River) in this subbasin, although six populations use this subbasin for rearing/migration. The Team concluded that all of these occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, roadbuilding, and urbanization. The Team also concluded that all of the habitat areas in this subbasin's watersheds warrant a low rating for conservation value to the ESU (NMFS, 2004a). However, that assessment pertained solely to the tributary habitat areas in these watersheds (e.g., Ash, Rickreall, and Harvey creeks), not the mainstem Willamette River. The Team concluded that all reaches of the Willamette River within this subbasin constitute a high value rearing and migration corridor. These high value reaches connect nearly all populations and watersheds in this ESU (except those in the Clackamas River) with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 8. Yamhill River Subbasin (HUC4# 17090008)

This subbasin contains seven watersheds, four of which are occupied by this ESU and encompass approximately 495 sq mi (1,282 sq km). Fish distribution and habitat use data from ODFW identify approximately 71 mi (114.3 km) of occupied riverine habitat (all used for rearing or migration) in these watersheds (ODFW, 2003a,b). Myers *et al.* (2003) did not identify a demographically independent population in this subbasin. Myers *et al.* (2003) noted that reports of ''Chinook salmon in westside tributaries have continued to the present; however it is unlikely the abundance of spawners in any of these tributaries constitutes a [demographically independent population].'' However, recent data (ODFW, 2004a,b) indicate that several watersheds in this subbasin likely contain important rearing and migration PCEs. Therefore, the Team concluded that all of these occupied areas contain rearing and migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, roadbuilding, and urbanization. The Team also concluded that habitat areas in all four occupied watersheds in this subbasin warrant a

low rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 9. Molalla/Pudding River Subbasin (HUC4# 17090009)

This subbasin contains six occupied watersheds encompassing approximately 875 sq mi (2,266 sq km). Fish distribution and habitat use data from ODFW identify approximately 181 mi (291.3 km) of occupied riverine habitat in these watersheds (ODFW, 2003a,b). The Team concluded that all of the occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, forestry, roadbuilding, and urbanization. The Team also concluded that habitat areas in two of the watersheds in this subbasin warrant a medium rating and those in four warrant a low rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 10. Clackamas River Subbasin (HUC4# 17090011)

This subbasin contains six occupied watersheds encompassing approximately 942 sq mi (2,440 sq km). This is the only subbasin with spawning habitat for this ESU below Willamette Falls. Fish distribution and habitat use data from ODFW identify approximately 137 mi (220.5 km) of occupied riverine habitat in these watersheds (ODFW, 2003a,b). Myers *et al.* (2003) identified one demographically independent population (Clackamas River) in this subbasin. The Team concluded that all of the occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, dams, forestry, roadbuilding, and urbanization. The Team also concluded that habitat areas in five of the watersheds in this subbasin warrant a high rating and those in one warrant a low rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 11. Lower Willamette/Columbia River Corridor

For the purposes of describing units of critical habitat designation for this ESU, we define the lower Willamette/Columbia River corridor as that segment from the confluence of the Willamette and Clackamas rivers to the Pacific Ocean. This corridor also includes the Multnomah Channel portion of the Lower Willamette River. Watersheds downstream of the Clackamas River subbasin (Johnson Creek and Columbia Slough/Willamette River watersheds) are outside the spawning range of this ESU and likely used in a limited way as juvenile rearing habitat for this ESU. Fish distribution and habitat use data from ODFW identify approximately 137 mi (220.5 km) of occupied riverine and estuarine habitat in this corridor (ODFW, 2003a,b). After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the Team concluded that the lower Willamette/Columbia River corridor was of high conservation value to the ESU. The Team noted that this corridor connects every watershed and population in this ESU with the ocean and is used by rearing/migrating juveniles and migrating adults. The Columbia River estuary is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (Marriott *et al.*, 2002). Management activities that may affect the PCEs in this corridor include channel modifications, roadbuilding, river/estuary traffic, roadbuilding, urbanization, and wetland loss and removal.

Upper Columbia River Spring-run Chinook Salmon ESU

The Upper Columbia River spring-run chinook ESU includes all naturally spawned populations of chinook salmon in all river reaches accessible to chinook salmon in Columbia River tributaries upstream of the Rock Island Dam and downstream of Chief Joseph Dam in Washington, excluding the Okanogan River (64 FR 14208; March 24, 1999). We have proposed that six artificial propagation programs also be considered part of the ESU (69 FR 33101; June 14, 2004): the Twisp River, Chewuch River, Methow Composite, Winthrop NFH, Chiwawa River, and White River spring-run chinook hatchery programs.

Spring-run chinook salmon in this ESU have a stream-type life history, which means that they enter freshwater before they are fully mature and finish maturing during their upriver spawning run. Three demographically independent populations of naturally spawning spring-run chinook salmon are identified for this ESU: the Wenatchee, Entiat, and Methow River Basin populations. Principally due to the small number of independent populations, the Interior Columbia Basin TRT (ICBTRT, 2003) has not identified separate major groupings or strata for the Upper Columbia River spring-run chinook ESU. Nonetheless, recovery planning will likely emphasize the need for a viable geographical distribution of the three populations comprising this ESU (Ruckelshaus *et al.*, 2002; McElhany *et al.*, 2003).

Adults returning to the Wenatchee River enter fresh water from late March through early May, and those returning to the Entiat and Methow Rivers enter fresh water from late March through June. The run timing of Upper Columbia River spring-run chinook tends to be relatively earlier in low flow years, and later in high flow years. Adults migrating upriver hold in deeper pools or under cover until the onset of spawning. Adults may spawn in the areas where they hold, or move further into smaller tributaries. Peak spawning for all three populations occurs from August to September, though the timing is highly dependent upon water temperature. The egg incubation/alevin stage occurs from August into December, and emergence occurs into March. The juveniles typically spend 1 year in freshwater before migrating downstream, primarily in May and June. Most adults return after spending 2 years in the ocean, although 20 to 40 percent return after 3 years at sea.

The Middle and Upper Columbia River Team's assessment for this ESU addressed habitat areas within 15 occupied watersheds in four associated subbasins (identified below as ''units'' with unique HUC4 numbers), as well as the Columbia River rearing/migration corridor. As part of its assessment, the Team considered the conservation value of each habitat area in the context of the productivity, spatial distribution, and diversity of habitats in the context of each of the three populations in the ESU. The Middle and Upper Columbia River Team evaluated the conservation value of habitat areas on the basis of the physical and biological habitat requirements of Upper Columbia River spring-run chinook salmon, consistent with the PCEs identified for Pacific salmon and *O. mykiss* described above in the Methods and Criteria Used to Identify Proposed Critical Habitat section.

Unit 1. Chief Joseph Subbasin (HUC4# 17020005)

This subbasin contains five watersheds, three of which are occupied by the ESU and encompass approximately 817 sq mi (2,116 sq km). Fish distribution and habitat use data

from WDFW identify approximately 42 mi (67.6 km) of occupied riverine habitat in the watershed (WDFW, 2003). However, the Team determined that occupied reaches in two watersheds (Jordan/Tumwater and Foster Creek) did not contain PCEs for this ESU because these reaches are located upstream of the uppermost population in the ESU (Methow River) and in areas that were likely to be of very minimal conservation value to the ESU (NMFS, 2004a). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Methow River) occupying this subbasin. The Team concluded that all occupied areas in the Upper Columbia/Swamp watershed contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, dams, fire activity and disturbance, forestry, grazing, and roadbuilding. The Team also concluded that habitat areas in this watershed warrant an overall medium rating for conservation value to the ESU and that the rearing and migration corridor in Columbia River reaches downstream of the confluence of the Methow River were of high conservation value (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 2. Methow Subbasin (HUC4# 17020008)

This subbasin contains seven occupied watersheds encompassing approximately 1,823 sq mi (4,722 sq km). Fish distribution and habitat use data from WDFW identify approximately 202 mi (325.1 km) of occupied riverine habitat in the watershed (WDFW, 2003). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Methow River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, fire activity and disturbance, forestry, grazing, irrigation impoundments and withdrawals, and roadbuilding. Of the seven watersheds reviewed by the Team, habitat areas in five were rated as having high and those in two were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team also noted that the watersheds with habitat areas having medium overall ratings (Middle Methow River and Lower Methow River) contain a high value rearing and migration corridor connecting high value habitat areas upstream with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 3. Upper Columbia/Entiat Subbasin (HUC4# 17020010)

This subbasin contains four occupied watersheds (but two of these consist of a rearing/migration corridor downstream of Rock Island Dam—see Unit 5 below). The two watersheds in this subbasin with tributary habitat (*i.e.*, tributaries to the Columbia River mainstem) encompass approximately 907 sq mi (2,349.1 sq km). Fish distribution and habitat use data from WDFW identify approximately 103 mi (165.8 km) of occupied riverine habitat in the subbasin (WDFW, 2003). The Interior Columbia Basin TRT (2003) identified three demographically independent populations (Methow River, Entiat River, and Wenatchee River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, fire activity and disturbance, forestry, grazing, irrigation impoundments and withdrawals, and roadbuilding. Of the two watersheds reviewed by the Team, habitat areas in one were rated as having high and those in the other were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team also concluded that both watersheds contain high value rearing and migration corridors connecting high value habitat areas upstream with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 4. Wenatchee Subbasin (HUC4# 17020011)

This subbasin contains five occupied watersheds encompassing approximately 1,328 sq mi (3,440 sq km). Fish distribution and habitat use data from WDFW identify approximately 182 mi (292.9 km) of occupied riverine habitat in the subbasin (WDFW, 2003). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Wenatchee River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, fire activity and disturbance, forestry, grazing, irrigation impoundments and withdrawals, and roadbuilding. Of the five watersheds reviewed by the Team, habitat areas in three were rated as having high and those in two were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 5. Columbia River Corridor

For the purposes of describing units of critical habitat designation for this ESU, we define the Columbia River corridor as that segment from Rock Island Dam downstream to the Pacific Ocean. Rock Island Dam is located near the downstream border of the Entiat River watershed, which was the furthest downstream watershed with spawning or tributary PCEs identified in the range of this ESU. Fish distribution and habitat use data from WDFW identify approximately 448 mi (721 km) of occupied riverine and estuarine habitat in this corridor (WDFW, 2003). After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the Team concluded that the Columbia River corridor was of high conservation value to the ESU. The Team noted that this corridor connects every watershed and population in this ESU with the ocean and is used by rearing/migrating juveniles and migrating adults. The Columbia River estuary is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (Marriott *et al.*, 2002). Management activities that may affect the PCEs in this corridor include channel modifications, dams, irrigation impoundments and withdrawals, roadbuilding, river/estuary traffic, roadbuilding, urbanization, and wetland loss and removal.

Oregon Coast Coho Salmon ESU

The Oregon Coast coho ESU includes all naturally spawned populations of coho salmon in Oregon coastal streams south of the Columbia River and north of Cape Blanco (63 FR 42587; August 10, 1998). We have proposed that five artificial propagation programs also be considered part of the ESU (69 FR 33101; June 14, 2004): the North Umpqua River (ODFW stock # 18), Cow Creek (ODFW stock # 37), Coos Basin (ODFW stock # 37), Coquille River (ODFW stock # 44), and North Fork Nehalem River (ODFW stock # 32) coho hatchery programs.

Geographical isolation is an important factor in the evolution of these separate populations within or between basins.

The Oregon Coast coho ESU is, in general, composed of relatively small basins (the Umpqua basin, an exception to this general rule, is a relatively large basin characterized by diverse vegetation and geology). The distance between saltwater entry points of each basin may significantly affect the level of migration or connectivity among populations. Some populations may be significantly affected by migrants from larger or more productive systems The Oregon-Northern California Coast TRT has putatively identified 19 ''functionally'' and ''potentially'' independent populations and 48 additional dependent populations (Lawson *et al.*, 2004). The functionally and potentially independent populations include: the Necanicum River, Nehalem River, Tillamook Bay, Nestucca River, Salmon River, Siletz River, Yaquina River, Beaver Creek, Alsea River, Siuslaw River, Siltcoos River (lake), Tahkenitch Creek (lake), Lower Umpqua River, Upper Umpqua River, Tenmile Creek (lake), Coos Bay, Coquille River, Floras Creek, and Sixes River populations. Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of the ESU (Ruckelshaus *et al.*, 2002; McElhany *et al.*, 2003). Ecological strata or regions have not been identified for the Oregon Coast coho ESU. The TRT noted that, given the dominant influence of the ocean on the Oregon Coast climate, ecological conditions are relatively uniform throughout the ESU. The Umpqua River Basin is an exception, with inland areas being drier and experiencing more extreme temperatures than the coastal areas. Ecological differences within the ESU relate to the effects of local topography on rainfall, and of local geology on vegetation composition and slope stability.

Adult coho salmon begin migrating into coastal streams and rivers with the first freshets in the fall. Spawning begins in November, peaking in December or January, and may continue into March. Eggs hatch in the spring and fry grow rapidly to the parr stage by early summer or early fall. Parr then seek out areas protected from high flows and spend a second winter in freshwater before migrating to the ocean as smolts from March through June. Smolt outmigration timing and smolt size appear to respond to small-scale habitat variability and have been shown to be affected by anthropogenic activities including: habitat degradation (Moring and Lantz, 1975) and habitat restoration (Johnson *et al.*, 1993; Rodgers *et al.*, 1993). About 20 percent of males mature at age 2 and return to freshwater as ''jacks'' in the same year they entered the ocean as adults. Although the production of jacks is a heritable trait in coho salmon (Iwamoto *et al.*, 1984), the proportion of jacks in a given coho salmon populations is strongly influenced by environmental factors (Silverstein and Hershberger, 1992). The remainder of juveniles rear in the ocean for 18 months and return as 3-year-old adults in the following fall.

Habitat capacity for coho salmon on the Oregon Coast has significantly decreased from historical levels (NMFS, 2003). During periods of poor ocean survival, high quality habitat is necessary to sustain coho populations (Nickelson and Lawson, 1998). The following habitat features have been identified as important to the recovery of Oregon Coast coho salmon (IMST, 2002): structure and function of lowland areas, wetland, floodplains, and riparian forests; the presence of large wood on beaches and stream banks, and in streams, channels, estuaries, and floodplains; water quality, including temperature; hydrologic function and flow regimes; connectivity of rivers with floodplain and off-channel habitats; and the presence of diverse native plant communities subject to natural disturbance regimes.

The Oregon Coast Team's assessment for this ESU addressed habitat areas within 80 occupied watersheds in 13 associated subbasins (identified below as ''units'' with unique HUC4 numbers). As part of its assessment, the Team considered the conservation value of each habitat area in the context of the productivity, spatial distribution, and diversity of habitats across the range of the populations identified by the Oregon-Northern California Coast TRT. The Oregon Coast Team evaluated the conservation value of habitat areas on the basis of the physical and biological habitat requirements of Oregon Coast coho salmon, consistent with the PCEs identified for Pacific salmon and *O. mykiss* described above in the Methods and Criteria Used to Identify Proposed Critical Habitat section.

Unit 1. Necanicum River Subbasin (HUC4# 17100201)

This subbasin contains a single watershed which is occupied by the ESU and encompasses approximately 137 sq mi (355 sq km). Fish distribution and habitat use data from ODFW identify approximately 87 mi (140 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The Oregon-Northern California Coast TRT (2003) putatively identified one ''potentially'' independent population (the Necanicum River population) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including: forestry, grazing, and urbanization. The Oregon Coast Team concluded that habitat areas in the one occupied watershed comprising this subbasin are of medium conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 2. Nehalem River Subbasin (HUC4# 17100202)

This subbasin contains six watersheds, each of which is occupied by the ESU. These watersheds encompass approximately 855 sq mi (2,214.4 sq km). Fish distribution and habitat use data from ODFW identify approximately 675 mi (1,086.3 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The Oregon-Northern California Coast TRT (2003) identified one ''functionally'' independent population (the Nehalem River population) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including: agriculture, forestry, grazing, and urbanization. Of the six watersheds reviewed by the Team, habitat areas in all but one watershed were rated as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 3. Wilson-Trask-Nestucca Rivers Subbasin (HUC4# 17100203)

This subbasin contains nine watersheds, each of which are occupied by the ESU. These watersheds encompass approximately 889 sq mi (2,302 sq km). Fish distribution and habitat use data from ODFW identify approximately 632 mi (1,017.1 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The Oregon-Northern California Coast TRT (2003) identified two ''functionally'' independent populations (the Tillamook Bay and Nestucca River populations) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including: agriculture,

forestry, urbanization, and river, estuary and ocean traffic. Of the nine watersheds reviewed by the Team, habitat areas in seven were rated as having high, and those in two were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 4. Siletz-Yaquina Rivers Subbasin (HUC4# 17100204)

This subbasin contains nine watersheds, eight of which are occupied by the ESU and encompass approximately 642 sq mi (1,663 sq km). Fish distribution and habitat use data from ODFW identify approximately 612 mi (984.9 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The Oregon-Northern California Coast TRT (2003) identified three ''functionally'' or ''potentially'' independent populations (the Salmon, Siletz, and Yaquina River populations) in this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including: agriculture, forestry, grazing, sand and gravel mining, urbanization, and river, estuary, and ocean traffic. Of the eight watersheds reviewed by the Team, habitat areas in three were rated as having high, and those in five were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 5. Alsea River Subbasin (HUC4# 17100205)

This subbasin contains eight watersheds, each of which is occupied by the ESU. These watersheds encompass approximately 690 sq mi (1,787.1 sq km). Fish distribution and habitat use data from ODFW identify approximately 559 mi (899.6 km) of occupied riverine habitat in the subbasin (ODFW, 2003A,B). The Oregon-Northern California Coast TRT (2003) identified two ''functionally'' or ''potentially'' independent populations (the Beaver Creek and Alsea River populations) in this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including: agriculture, forestry, grazing, sand and gravel mining, and urbanization. Of the eight watersheds reviewed by the Team, habitat areas in four were rated as having high, those in three were rated as having medium, and those in one (the Big Creek/Vingie Creek watershed) were rated as having low conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 6. Siuslaw River Subbasin (HUC4# 17100206)

This subbasin contains eight watersheds, each of which is occupied by the ESU. These watersheds encompass approximately 776 sq mi (2,010 sq km). Fish distribution and habitat use data from ODFW identify approximately 774 mi (1,245.6 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The Oregon-Northern California Coast TRT (2003) identified one ''functionally'' independent population (the Siuslaw River population) in this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including: agriculture, forestry, grazing, and urbanization. Of the eight watersheds reviewed by the Team, habitat areas in six were rated as having high, and those in two were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 7. Siltcoos River Subbasin (HUC4# 17100207

This subbasin contains one watershed which is occupied by the ESU and encompasses approximately 131 sq mi (339.3 sq km). Fish distribution and habitat use data from ODFW identify approximately 137 mi (220.5 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The Oregon-Northern California Coast TRT (2003) identified two ''potentially'' independent populations (the Siltcoos River (lake) and Tahkenitch Creek (lake) populations) in this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including: forestry, grazing, and urbanization. The Oregon Coast Team concluded that habitat areas in the one occupied watershed comprising this subbasin is of high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 8. North Fork Umpqua River Subbasin (HUC4# 17100301)

This subbasin contains 12 watersheds; however, due to habitat blockage from the Soda Springs Dam, only the lower seven watersheds are accessible to Oregon Coast coho salmon. These seven occupied watersheds encompass approximately 924 sq mi (2,393.2 sq km). Fish distribution and habitat use data from ODFW identify approximately 175 mi (281.6 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The Oregon-Northern California Coast TRT (2003) identified one ''functionally'' independent population (the Upper Umpqua River population) that is contained within this subbasin and the South Fork Umpqua River subbasin (HUC4# 17100302, below). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including: agriculture, forestry, grazing, and urbanization. Of the seven watersheds reviewed by the Team, habitat areas in one watershed were rated as having high, those in three watersheds were rated as having medium, and those in three watersheds were rated as having low conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 9. South Fork Umpqua River Subbasin (HUC4# 17100302)

This subbasin contains 13 watersheds, of which 12 are occupied by the ESU encompassing approximately 1,727 sq mi (4,473 sq km). Fish distribution and habitat use data from ODFW identify approximately 693 mi (1,115.3 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The Oregon-Northern California Coast TRT (2003) identified one ''functionally'' independent population (the Upper Umpqua River population) that is contained within this subbasin and the North Fork Umpqua River subbasin (HUC4# 17100301, above). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including: agriculture, forestry, grazing, irrigation impoundments and withdrawals, mineral mining, sand and gravel mining, and urbanization. Of the 12 watersheds reviewed by the Team,

habitat areas in one watershed were rated as having high, those in eight watersheds were rated as having medium, and those in three watersheds were rated as having low conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 10. Umpqua River Subbasin (HUC4# 17100303)

This subbasin contains eight watersheds, each of which is occupied by the ESU. These watersheds encompass approximately 1,514 sq mi (3,921 sq km). Fish distribution and habitat use data from ODFW identify approximately 1,083 mi (1,742.9 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The Oregon-Northern California Coast TRT (2003) identified one ''functionally'' independent population (the Lower Umpqua River population) that is contained within this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including: agriculture, forestry, grazing, irrigation impoundments and withdrawals, mineral mining, urbanization, and river, estuary, and ocean traffic. Of the eight watersheds reviewed by the Team, habitat areas in five watersheds were rated as having high, those in two watersheds were rated as having medium, and those in one watershed were rated as having low conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 11. Coos River Subbasin (HUC4# 17100304)

This subbasin contains four watersheds, each of which is occupied by the ESU. These watersheds encompass approximately 737 sq mi (1,909 sq km). Fish distribution and habitat use data from ODFW identify approximately 541 mi (870.6 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The Oregon-Northern California Coast TRT (2003) identified one ''potentially'' independent population (the Coos Bay population) in this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including: agriculture, forestry, grazing, and urbanization. Of the four watersheds reviewed by the Team, habitat areas in all four were rated as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 12. Coquille River Subbasin (HUC4 # 17100305)

This subbasin contains six watersheds, each of which is occupied by the ESU. These watersheds encompass approximately 1,057 sq mi (2,738 sq km). Fish distribution and habitat use data from ODFW identify approximately 546 mi (878.7 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The Oregon-Northern California Coast TRT (2003) identified one ''functionally'' independent population (the Coquille River population) in this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including: agriculture, forestry, grazing, irrigation impoundments and withdrawals, mineral mining, and urbanization. Of the six watersheds reviewed by the Team, habitat areas in four were rated as having high, those in one were rated as having medium, and those in one were rated as having low conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 13. Sixes River Subbasin (HUC4 # 17100306)

This subbasin contains four watersheds, two of which are occupied by the ESU and encompass approximately 290 sq mi (751.1 sq km). Fish distribution and habitat use data from ODFW identify approximately 149 mi (239.8 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The Oregon-Northern California Coast TRT (2003) identified two ''potentially'' independent populations (the Sixes River and Floras Creek populations) in this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including: agriculture, forestry, grazing, irrigation impoundments and withdrawals, and sand and gravel mining. Of the two watersheds reviewed by the Team, habitat areas in one were rated as having high, and those in the other were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Hood Canal Summer-run Chum Salmon ESU

The Hood Canal summer-run chum salmon ESU includes all naturally spawned populations of summer-run chum salmon in Hood Canal and its tributaries as well as populations in Olympic Peninsula rivers between Hood Canal and Dungeness Bay, Washington (64 FR 14508; March 25, 1999). We have proposed that eight artificial propagation programs also be considered part of the ESU (69 FR 33101; June 14, 2004): the Quilcene NFH, Hamma Hamma Fish Hatchery, Lilliwaup Creek Fish Hatchery, Union River/Tahuya, Big Beef Creek Fish Hatchery, Salmon Creek Fish Hatchery, Chimacum Creek Fish Hatchery, and the Jimmycomelately Creek Fish Hatchery summer-run chum hatchery programs.

Sixteen historical demographically independent populations of Hood Canal summer-run chum have been identified for this ESU: eight extant populations (the Union River, Lilliwaup Creek, Hamma Hamma River, Duckabush River, Dosewallips River, Big/Little Quilcene River, Snow and Salmon creeks, Jimmycomelately Creek populations), and eight extirpated or possibly extirpated populations (the Dungeness River, Big Beef Creek, Anderson Creek, Dewatto Creek, Tahuya River, Skokomish River, Finch Creek, and Chimacum Creek populations) (WDFW and PNPTT, 2000). The Puget Sound TRT has identified 5 ''geographic regions of diversity and correlated risk'' in Puget Sound (Ruckelshaus *et al.,* 2002). The regions are based on similarities in hydrographic, biogeographic, geologic, and catastrophic risk characteristics and where groups of populations have evolved in common (Ruckelshaus *et al.,* 2002). The Hood Canal summer-run chum salmon ESU occupies two of these regions—the Strait of Juan de Fuca and Hood Canal. Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of such regions in an ESU (Ruckelshaus *et al.,* 2002; McElhany *et al.,* 2003).

Hood Canal summer-run chum are the southernmost occurrence of the summer-run life history for the species. The ESU appears to be uniquely adapted to the local habitat conditions, with this life-history persisting in what otherwise would be deemed an inhospitable environment. The summer chum streams are characterized by low

summer/fall flows and likely experience elevated stream temperatures during the summer chum spawning periods. Given the return timing of summer-run chum and the associated low flow conditions of spawning streams, chum are confined to the lower reaches of the streams (Crawford, 1997; Turner, 1995). Degradation of spawning habitat, reduced river flows, increased urbanization of the Kitsap Peninsula, and increased pinniped populations in Hood Canal have been cited as habitat limiting factors for the Hood Canal summer-run chum ESU (Johnson *et al.,* 1997).

The Summer Chum Salmon Conservation Initiative (WDFW and PNPTT, 2000) provides a comprehensive overview of this ESU and describes the following life history and habitat requirements. Migration to spawning grounds occurs from late August through late October. Adults generally spawn in low gradient, lower mainstem reaches of natal streams, typically in center channel areas due to the low flows encountered in the late summer and early fall. Eggs incubate in redds for 5 to 6 months, and fry emerge between January and May. After hatching, fry move rapidly downstream to subestuarine habitats. WDFW and PNPTT (2000) noted that successful incubation and rearing depends on a variety of conditions including: (1) The presence of adequate large woody debris to reduce scour of incubating eggs and moderate peak winter flow velocities, (2) the absence of excessive fines within spawning gravel, (3) stable channel configuration, and (4) access to floodplain and off-channel areas. Subestuary deltas support a diverse array of habitats (tidal channels, mudflats, marshes, and eelgrass meadows) that provide essential rearing and transition environments for this ESU. Juveniles rear in these habitats for days to weeks before entering the ocean, and returning adults stage in subestuaries before ascending natal streams to spawn. Juveniles feed primarily on plankton and epibenthic organisms, while subadults feed on similar items as well as larger prey (including fishes and squid). Most adults mature and spawn as 3- and 4-year old fish (WDFW and PNPTT, 2000).

The Puget Sound Team's assessment for this ESU addressed habitat areas within 12 occupied watersheds in four associated subbasins (identified below as ''units'' with unique HUC4 numbers) as well as the nearshore marine area. As part of its assessment, the Team considered the conservation value of each habitat area in the context of the productivity, spatial distribution, and diversity of habitats across the range of the two geographical regions of correlated risk identified by the Puget Sound TRT. The Puget Sound Team evaluated the conservation value of habitat areas on the basis of the physical and biological habitat requirements of Hood Canal summer-run chum salmon, consistent with the PCEs identified for Pacific salmon and *O. mykiss* described above in the Methods and Criteria Used to Identify Proposed Critical Habitat section.

Unit 1. Skokomish Subbasin (HUC4# 17110017)

This subbasin contains a single occupied watershed encompassing approximately 245 sq mi (635 sq km). The Skokomish River population is the only historic population documented in this subbasin/watershed (WDFW and PNPTT, 2000). Fish distribution and habitat use data from WDFW identify approximately 13 mi (20.9 km) of occupied riverine/estuarine habitat in the subbasin/watershed (WDFW and PNPTT, 2000). The Team concluded that all of these occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including channel modifications/diking, dam operations, forestry, and urbanization. The Team also concluded that habitat areas in this watershed warrant a medium rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 2. Hood Canal Subbasin (HUC4# 17110018)

This subbasin contains seven occupied watersheds encompassing approximately 715 sq mi (1,852 sq km). WDFW and PNPTT (2000) identified the following historic populations in this subbasin: Union River, Lilliwaup Creek, Hamma Hamma River, Duckabush River, Dosewallips River, Big/Little Quilcene River, Big Beef Creek, Anderson Creek, Dewatto Creek, Tahuya River, and Finch Creek. Several of these have undergone recent extirpations but are now occupied through natural recolonization or re-introduction (WDFW and PNPTT, 2000; NMFS, 2004a). Fish distribution and habitat use data from WDFW identify approximately 50 mi (80.5 km) of occupied riverine/estuarine habitat in the watersheds (WDFW, 2003; NMFS, 2004a; WDFW, 2004). The Team concluded that all of these occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including channel modifications/diking, forestry, and urbanization. The Team also concluded that habitat areas in six of the watersheds in this subbasin warrant a high rating, and those in one warrant a medium rating for conservation value to the ESU (NMFS, 2004a). The Team identified two streams (Finch Creek and Anderson Creek) that are currently unoccupied but essential for the conservation of the ESU. These streams historically supported independent populations of summer-run chum salmon (WDFW and PNPTT, 2000) and, due to the limited number of areas occupied by this ESU, are likely to be important areas for ESU expansion during recovery (NMFS, 2004a). Moreover, the Summer Chum Salmon Conservation Initiative (WDFW and PNPTT, 2000) is being implemented and recommends both streams for reintroduction of summer-run chum.

Unit 3. Kitsap Subbasin (HUC4# 17110019)

This subbasin contains a single occupied watershed encompassing approximately 82 sq mi (212.4 sq km). The Chimacum Creek population is the only historic population documented in this subbasin/watershed (WDFW and PNPTT, 2000). Fish distribution and habitat use data from WDFW identify approximately 1 mile (1.6 km) of occupied riverine/estuarine habitat in the watershed (WDFW, 2003; WDFW, 2004). The Team concluded that this occupied area contains spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, forestry, and urbanization. The Team also concluded that habitat areas in this watershed warrant a high rating for conservation value to the ESU (NMFS, 2004a). The Team identified an additional 5-mile (8-km) stream segment in Chimacum Creek that is currently unoccupied but essential for the conservation of the ESU. This stream segment historically supported the Chimacum Creek population of summer-run chum salmon (WDFW and PNPTT, 2000) and, due to the limited number of areas occupied by this ESU, is likely to be an important area for ESU expansion during recovery (NMFS, 2004a).

Unit 4. Dungeness-Elwha Subbasin (HUC4# 17110020)

This subbasin contains three occupied watersheds encompassing approximately 350 sq mi (906 sq km). WDFW and PNPTT (2000) identified the following historic populations in this

subbasin: Dungeness River, Jimmycomelately Creek, and Snow/Salmon creeks. Fish distribution and habitat use data from WDFW identify approximately 19 mi (30.6 km) of occupied riverine/estuarine habitat in the watersheds (WDFW, 2003). The Team concluded that all of these occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including channel modifications/diking, forestry, and urbanization. The Team also concluded that habitat areas in two of the watersheds in this subbasin warrant a high rating, and those in one warrant a medium rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 5. Nearshore Marine Area

The nearshore marine area considered by the Team includes that zone from extreme high water out to a depth of 30 m and adjacent to watersheds occupied by the ESU (described above). The Team assessment focused on this area because it generally encompasses photic zone habitats supporting plant cover (*e.g.*, eelgrass and kelp) important for rearing, migrating, and maturing chum salmon and their prey. Also, PCEs that may require special management considerations or protection are more readily identified in this zone (*e.g.*, destruction of vegetative cover due to docks and bulkheads). Deeper waters are occupied by subadult and maturing fish, but it is unclear if these areas contain PCEs that require special management considerations or protection. The Team concluded that all nearshore habitat areas from the southern terminus of Hood Canal northeast to Dungeness Bay in the Strait of Juan de Fuca warrant a high conservation value to the ESU (NMFS, 2004a). These habitat areas are found along approximately 402 miles (647 km) of shoreline within the range of this ESU.

Columbia River Chum Salmon ESU

The Columbia River chum salmon ESU includes all naturally spawned populations of chum salmon in the Columbia River and its tributaries in Washington and Oregon (64 FR 14508; March 25, 1999). We have proposed that three artificial propagation programs also be considered part of the ESU (69 FR 33101; June 14, 2004): the Chinook River (Sea Resources Hatchery), Grays River, and Washougal River/Duncan Creek chum hatchery programs.

The Willamette/Lower Columbia River TRT identified 16 historical demographically independent populations of chum in the Columbia River: the Youngs Bay, Grays River, Big Creek, Elochoman River, Clatskanie River, Mill Creek, Scappoose Creek, Cowlitz River fall-run and summer-run, Kalama fall-run, Salmon Creek fall-run, Lewis River fall-run, Clackamas River fall-run, Washougal River fall-run, Lower Gorge tributaries fall-run, and the Upper Gorge tributaries fall-run populations (Myers *et al.*, 2003). All but two of these historical populations appear to have been extirpated, or nearly so. Although the historical record for Columbia River chum salmon is limited, it is clear that chum salmon were present in most tributaries to the lower Columbia River and to some extent in the mainstem (Myers *et al.*, 2003). Populations in the Coast Range tributaries (*e.g.*, Grays River) differ in peak spawning activity by approximately a month relative to the Lower Gorge tributaries population. Differences in the time of spawning may be related to differences in water sources (rainfall in the Coast Range vs. groundwater in the Lower Gorge). There is insufficient information to provide a clear understanding of the migration dynamics among chum populations in the Columbia River, and hence the specific habitat characteristics to which local chum populations may be adapted is not understood. In general, extant Columbia River chum spawning aggregations are most abundant in the lower mainstem and off-channel areas. The TRT has placed groups of populations in this recovery planning domain into ''strata'' intended to assist in evaluating ESU-wide recovery scenarios (McElhany *et al.*, 2002). The strata are based on major life history characteristics (*e.g.*, species run types) and ecological zones. The Columbia River chum salmon ESU inhabits three ecological zones (Coast Range, Cascade, and Columbia Gorge) and contains a single life history type (fall run), resulting in a total of three strata for this ESU (McElhany *et al.*, 2002). Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of such strata/regions in an ESU (Ruckelshaus *et al.*, 2002; McElhany *et al.*, 2003).

Intensive monitoring of chum spawning escapement is conducted in three Washington tributaries in the lower Columbia Basin-Grays River, Hardy Creek, and Hamilton Creek and in the mainstem Columbia River near Ives Island. The latter three populations are located immediately downstream of Bonneville Dam. Chum salmon populations exist in other river systems of the lower Columbia, but are not consistently monitored and are assumed to be extremely low in abundance.

Chum salmon returning to the Columbia River are considered a fall run. Adult fall run chum salmon return to the Columbia River from mid-October through November, but apparently do not reach the Grays River until late October–early December. Spawning occurs in the Grays River from early November to late December. Fish returning to Hamilton and Hardy Creeks begin to appear in the tributaries in early November, and their spawn timing is more protracted (mid-November–mid-January).

Chum seldom show persistence in surmounting river blockages and falls, which may be why they usually spawn in lower river reaches. Spawning chum salmon typically dig their redds in the mainstem or in side channels of rivers, often in areas just above tidal influence. They spawn in shallower, slower-running streams and side channels more frequently than do other salmonids. In some locations, subgravel flow (upwelled groundwater from seeps and springs) may be important in the choice of redd sites by chum salmon. Many Columbia River chum have been found to select spawning sites in areas of upwelling groundwater. New spawning grounds for chum were recently discovered along the northern Columbia River shoreline near the I–205 Glen Jackson Bridge where groundwater upwelling occurs. A significant number of chum returning to Hamilton Creek spawn in a spring-fed channel, and portions of the Grays River and Hardy Creek populations spawn in the area of springs. Hundreds of chum salmon once returned to spawn within spring-fed areas along Duncan Creek; efforts have been completed to restore passage to these productive areas and protect the springs that feed them.

Chum do not have a clearly defined smolt stage, but are nonetheless capable of adapting to seawater soon after emerging from gravel. Downstream migration may take only a few hours or days in rivers where spawning sites are close to the mouth of the river. Historical information concerning the timing of chum salmon emigration in the lower Columbia River is limited. Recent seining projects conducted in the Grays River and at Ives Island indicate outmigration occurs from March through May and peaks from mid-April to early May.

Chum salmon juveniles, like other anadromous salmonids, use estuaries to feed before beginning long-distance

oceanic migrations. However, chum and ocean-type chinook salmon usually have longer residence times in estuaries than do other anadromous salmonids. The period of estuarine residence appears to be the most critical phase in the life history of chum salmon and may play a major role in determining the size of the subsequent adult run back to fresh water. Chum salmon spend more of their life history in marine waters than other Pacific salmonids. Juveniles feed primarily on plankton and epibenthic organisms, while subadults feed on similar items as well as larger prey (including fishes and squid). Most adults mature and spawn as 3-year old fish.

The Lower Columbia River Team's assessment for this ESU addressed habitat areas within 19 occupied watersheds in 6 subbasins (identified below as ''units'' with unique HUC4 numbers), as well as the lower Columbia River rearing/migration corridor. As part of its assessment, the Team considered the conservation value of each habitat area in the context of the productivity, spatial distribution, and diversity of habitats across the range of the six life-history types and ecological strata identified by the Willamette/Lower Columbia TRT. The Lower Columbia River Team evaluated the conservation value of habitat areas on the basis of the physical and biological habitat requirements of Lower Columbia River chinook salmon, consistent with the PCEs identified for Pacific salmon and *O. mykiss* described above in the Methods and Criteria Used to Identify Proposed Critical Habitat section.

Unit 1. Middle Columbia/Hood Subbasin (HUC4# 17070105)

This subbasin contains 13 watersheds, 3 of which are occupied by this ESU (almost exclusively as rearing/migration habitat) and encompass approximately 669 sq mi (1,733 sq mi). This subbasin may be the upstream extent of the species' distribution in the entire Columbia River basin (Myers *et al.*, 2003). Fish distribution and habitat use data from WDFW identify approximately 26 mi (41.8 km) of occupied riverine habitat in the watersheds, including a 22-mi (35.4-km) segment of the Columbia River (WDFW, 2003). Myers *et al.* (2003) identified a single ecological zone (Columbia Gorge) containing two historical demographically independent populations in this subbasin (Upper Gorge Tributaries and Lower Gorge Tributaries). The Lower Gorge Tributaries population has been classified by the TRT as a ''core'' population (*i.e.*, historically abundant and ''may offer the most likely path to recovery'') as well as a genetic legacy population (*i.e.*, one of ''the most intact representatives of the genetic character of the ESU'') (McElhany *et al.*, 2003). The Team concluded that all occupied areas contain rearing or migration (and possibly spawning) PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, forestry, roadbuilding, and urbanization. Of the three watersheds reviewed by the Team, habitat areas in all were rated as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 2. Lower Columbia/Sandy Subbasin (HUC4# 17080001)

This subbasin contains nine watersheds, three of which are occupied by this ESU and encompass approximately 571 sq mi (1,479 sq km). This subbasin contains some of the principal spawning habitat for the entire ESU (*e.g.*, in Hardy and Hamilton creeks and adjacent areas of the mainstem Columbia River). Fish distribution and habitat use data from the WDFW identify approximately 84 mi (135.2 km) of occupied riverine habitat in the watersheds, including a 26-mi (41.8-km) segment of the Columbia River (ODFW, 2003a,b; WDFW, 2003). Myers *et al.* (2003) identified two ecological zones (Cascade and Columbia Gorge) containing three historical demographically independent populations in this subbasin: Lower Gorge Tributaries, Washougal River, and Salmon Creek. The Lower Gorge Tributaries population has been classified by the TRT as a ''core'' population (*i.e.*, historically abundant and ''may offer the most likely path to recovery'') as well as a genetic legacy population (*i.e.*, one of ''the most intact representatives of the genetic character of the ESU'') (McElhany *et al.*, 2003). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, forestry, roadbuilding, and urbanization. Of the three watersheds reviewed by the Team, habitat areas in all were rated as having high conservation value to the ESU (NMFS, 2004a). The Team also noted that the Columbia Gorge Tributaries watershed, in addition to the important mainstem spawning areas, also contains a high value rearing and migration corridor in the Columbia River connecting upstream habitat areas with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 3. Lewis Subbasin (HUC4# 17080002)

This subbasin contains six watersheds, two of which are currently occupied by this ESU with the remaining four blocked by Merwin Dam and others upstream. Occupied watersheds encompass approximately 456 sq mi (1,181 sq km). Fish distribution and habitat use data from WDFW identify approximately 71 mi (114.3 km) of occupied riverine habitat in the watersheds (WDFW, 2003). Myers *et al.* (2003) identified a single ecological zone (Cascade) containing one historical demographically independent population in this subbasin (Lewis River). The TRT has classified this as a ''core'' population (historically abundant and ''may offer the most likely path to recovery'') and the East Fork Lewis River summer-run population as a genetic legacy population (one of ''the most intact representatives of the genetic character of the ESU'') (McElhany *et al.*, 2003). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, forestry, roadbuilding, sand/gravel mining, and urbanization. The Team also concluded that habitat areas in both of the occupied watersheds warrant a high rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 4. Lower Columbia/Clatskanie Subbasin (HUC4# 17080003)

This subbasin contains six watersheds, three of which are occupied by this ESU and encompass approximately 543 sq mi (1,406 sq km). Fish distribution and habitat use data from WDFW identify approximately 51 mi (82.1 km) of occupied riverine habitat in these watersheds (WDFW, 2003). Myers *et al.* (2003) identified two ecological zones (Coast Range and Cascade) containing five historical demographically independent populations in this subbasin: Kalama River, Mill Creek, Elochoman River, Clatskanie River, and Scappoose River. The Elochoman River population has been classified by the TRT as a ''core'' population, *i.e.*, historically abundant

and ''may offer the most likely path to recovery'' (McElhany *et al.* 2003). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, forestry, roadbuilding, and urbanization. Of the three watersheds reviewed by the Team, habitat areas in all were rated as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 5. Lower Cowlitz Subbasin (HUC4# 17080005)

This subbasin contains eight watersheds, six of which are occupied by this ESU and encompass approximately 1,102 sq mi (2,854 sq km). Fish distribution and habitat use data from WDFW identify approximately 243 mi (391.1 km) of occupied riverine habitat in the watersheds (WDFW, 2003). Myers *et al.* (2003) identified one ecological zone (Cascade) containing a single historical demographically independent population (Cowlitz River) of chum salmon in this subbasin. This population has been classified by the TRT as a ''core'' population (*i.e.*, historically abundant and ''may offer the most likely path to recovery'') and a genetic legacy population (*i.e.*, one of ''the most intact representatives of the genetic character of the ESU'') (McElhany *et al.*, 2003). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, forestry, roadbuilding, and urbanization. Of the six watersheds reviewed by the Team, habitat areas in three were rated as having high and those in three were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team also noted that two watersheds (East Willapa and Coweeman River) contained high value rearing and migration corridors connecting high value habitat areas upstream with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 6. Lower Columbia Subbasin (HUC4# 17080006)

This subbasin contains three watersheds, two of which (Grays Bay and Big Creek) are occupied by this ESU and encompass approximately 304 sq mi (787.4 sq km). Fish distribution and habitat use data from ODFW and WDFW identify approximately 62 mi (99.8 km) of occupied riverine habitat in the watersheds (ODFW, 2003a,b; WDFW, 2003). The Team received recent data from ODFW (Turner, NMFS, personal communication) indicating that the Big Creek watershed is occupied by this ESU, even though ODFW data identifies these reaches as ''historically occupied.'' Myers *et al.* (2003) identified a single ecological zone (Coast Range) containing three demographically independent populations in this subbasin (Grays and Chinook Rivers, Youngs Bay, and Big Creek). The Youngs Bay, Grays and Chinook Rivers, and Big Creek populations have been classified by the TRT as ''core'' populations (*i.e.*, historically abundant and ''may offer the most likely path to recovery'') (McElhany *et al.*, 2003). In addition, the TRT classified the Grays and Chinook Rivers population as a genetic legacy population (*i.e.*, one of ''the most intact representatives of the genetic character of the ESU.'') The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, forestry, roadbuilding, and wetland loss and removal. The Team also concluded that habitat areas in both of the occupied watersheds warrant a high rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 7. Lower Columbia River Corridor

For the purposes of describing units of critical habitat designation for this ESU, we define this corridor as that segment of the Columbia River from the confluences of the Sandy River (Oregon) and Washougal River (Washington) to the Pacific Ocean. Fish distribution and habitat use data from WDFW identify approximately 118 mi (189.9 km) of occupied riverine and estuarine habitat in this corridor (WDFW, 2003). After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the Team concluded that the lower Columbia River corridor was of high conservation value to the ESU. Other upstream reaches of the Columbia River corridor (within Units 1 and 2 above) are also high value for rearing/migration. The Team noted that this corridor connects every watershed and population in this ESU with the ocean and is used by rearing/migrating juveniles and migrating adults. The Columbia River estuary is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (Marriott *et al.*, 2002). Management activities that may affect the PCEs in this corridor include channel modifications, roadbuilding, river/estuary traffic, roadbuilding, urbanization, and wetland loss and removal.

Ozette Lake Sockeye Salmon ESU

The Ozette Lake sockeye salmon ESU includes all naturally spawned populations of sockeye salmon in Ozette Lake and streams and tributaries flowing into Ozette Lake, Washington (64 FR 14528; March 25, 1999). We have proposed that two artificial propagation programs also be considered part of this ESU (69 FR 133101; June 14, 2004): the Umbrella Creek and Big River sockeye hatchery programs. The Puget Sound TRT considers the Ozette Lake sockeye ESU to be comprised of one historical population with multiple spawning aggregations.

Migration of adult sockeye salmon (typically 4-year-old fish) up the Ozette River generally occurs from April to early August (WDFW *et al.*, 1993). High water temperatures in the lake and river and low water flows in the summer may create a thermal block to migration and influence timing of the sockeye salmon migration (LaRiviere, 1991). Recorded water temperatures in late-July and August in the Ozette River near the lake outlet have exceeded the temperature range over which sockeye salmon are known to migrate (Gustafson *et al.*, 1997).

Disjunct spawning times for fish at different beach spawning sites within the lake suggest that Ozette Lake sockeye may be composed of discrete subpopulations or spawning aggregations (Dlugokenski *et al.*, 1981). The primary existing spawning aggregations occur in two beach locations, Allen's and Olsen's beaches, and in two tributaries, Umbrella Creek and Big River. Both of the tributary spawning groups were initiated through a hatchery introduction program. Spawning fish are occasionally found in other tributaries and may occur at other beach locations within the lake (Makah Fisheries, 2000). The extent to which sockeye spawned historically in tributaries to the lake is controversial (Gustafson *et al.*, 1997), but it is clear that multiple beach-spawning aggregations of sockeye occurred historically, and that genetically distinct kokanee currently spawn in large numbers in all surveyed lake tributaries

(except Umbrella Creek and Big River). During low water levels in summer, much of the available beach spawning habitat may become exposed (Bortleson and Dion, 1979).

Eggs and alevins reside beneath fine gravel/cobble generally from 1.3 to 10.2 cm in diameter (Reiser and Bjornn, 1979). Incubation is temperature dependent and generally takes as little as 50 days (or less) or more than 5 months (Hart, 1973). After hatching most juveniles spend one winter in Ozette Lake rearing before outmigrating to the ocean as 2-year-old fish during April and May (Dlugokenski *et al.*, 1981). Juvenile sockeye feed primarily on plankton and a variety of terrestrial and aquatic insects (Hart, 1973; Scott and Crossman, 1973). The fish typically spend 2 years in the northeast Pacific Ocean foraging on zooplankton, squid, and, infrequently, on small fishes (Scott and Crossman, 1973).

The Puget Sound Team's assessment for this ESU addressed habitat areas in the one occupied watershed. The Team evaluated these habitat areas on the basis of the physical and biological habitat requirements of Ozette Lake sockeye salmon, consistent with the PCEs identified for Pacific salmon and *O. mykiss* described above in the Methods and Criteria Used to Identify Proposed Critical Habitat section.

Unit 1. Ozette Lake Subbasin (HUC4# 17100101)

This subbasin includes a single watershed encompassing approximately 101 sq mi (262 sq km), with Ozette Lake being the dominant feature. Fish distribution and habitat use type data from WDFW identify approximately 40 mi (64.4 km) of occupied riverine/estuarine habitat in this watershed (WDFW, 2003). In addition, Ozette Lake covers approximately 12 sq mi (31.1 sq km) and contains important spawning beaches and rearing areas. The Team concluded that all of these occupied areas contained PCEs, including spawning beaches, lake and river rearing habitat, and river migration corridors (NMFS, 2004a). Management activities that may affect PCEs in this watershed include, but are not limited to, forestry and introduction of exotic invasive plants. This watershed supports the one and only population constituting this ESU; therefore, the Team concluded that the habitat areas in this watershed warrant a high rating for conservation value to the ESU. While the Team did not identify any unoccupied areas that may be essential for this ESU, they did note that tributary streams near lake spawning beaches may have a major influence on PCEs (e.g., sedimentation and substrate recruitment).

Upper Columbia River O. mykiss ESU

The Upper Columbia River *O. mykiss* ESU includes all naturally spawned populations of anadromous *O. mykiss* in streams in the Columbia River Basin upstream from the Yakima River, Washington, to the U.S.-Canada border (62 FR 43937; August 18, 1997). We have proposed that resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations also be included in the Upper Columbia River *O. mykiss* ESU (69 FR 33101; June 14, 2004). The ESU membership of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, has not been resolved. These resident populations are provisionally not considered to be part of the Upper Columbia River *O. mykiss* ESU until such time that significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships. We have proposed that six artificial propagation programs also be considered part of the ESU (69 FR 33101; June 14, 2004): the Wenatchee River, Wells Hatchery (in the Methow and Okanogan Rivers), Winthrop NFH, Omak Creek, and the Ringold *O. mykiss* hatchery programs.

The Interior Columbia Basin TRT (2003) did not identify separate major ecological groupings strata for this ESU due to the relatively small number of populations. Four populations are identified for the Upper Columbia River *O. mykiss* ESU: the Wenatchee River, Methow River, Entiat River, and Okanogan Basin population.

Unlike Pacific salmon, *O. mykiss* are capable of spawning more than once before death. However, it is rare for anadromous *O. mykiss* to spawn more than twice before dying, and most that do so are females. Anadromous *O. mykiss* can be divided into two basic run types based on their level of sexual maturity at the time they enter fresh water and the duration of the spawning migration. The stream-maturing type, or summer run, enters fresh water in a sexually immature condition and requires several months in fresh water to mature and spawn. The ocean-maturing type, or winter run, enters fresh water with well-developed gonads and spawns relatively shortly after river entry. Anadromous fish in the Upper Columbia River *O. mykiss* ESU are made up entirely of summer *O. mykiss.*

Upper Columbia River *O. mykiss* spawn in cool, clear streams with suitable gravel size, depth, and current velocity. They sometimes also use smaller streams for spawning. Adult *O. mykiss* enter fresh water between May and October. During summer and fall before spawning, they hold in cool, deep pools. They migrate inland toward spawning areas, overwinter in the larger rivers, resume migration to natal streams in early spring, and then spawn. In general, adults in this ESU spawn later than in most downstream populations—often remaining in fresh water for a year before spawning.

Depending on water temperature, *O. mykiss* eggs may incubate for 1.5 to 4 months before hatching. Rearing takes place primarily in the faster parts of pools, although young-of-the-year are abundant in glides and riffles. Some older juveniles move downstream to rear in larger tributaries and mainstem rivers. Productive *O. mykiss* habitat is characterized by complexity—primarily in the form of large and small wood. The dry habitat conditions in the Upper Columbia River are less conducive to *O. mykiss* survival than in many other parts of the Columbia River Basin. Although the life history of this ESU is similar to that of other inland *O. mykiss,* smolt ages are some of the oldest on the West Coast (up to 7 years old), probably due to the area's cold water temperatures. The cold stream temperatures also lead to the possibility that many fish in this ESU may be thermally-fated to a resident (rainbow trout) life history regardless of whether they are the progeny of resident or anadromous *O. mykiss* parents. Most current natural production occurs in the Wenatchee and Methow River systems, with a smaller run returning to the Entiat River. Very limited spawning also occurs in the Okanagan River Basin. Most of the anadromous fish spawning in natural production areas are of hatchery origin. The limited data available indicate that anadromous *O. mykiss* smolts in this ESU are dominated by 2-year-olds. It also appears that anadromous *O. mykiss* from the Wenatchee and Entiat rivers return to fresh water after 1 year in salt water, whereas those in the Methow River primarily return after 2 years of ocean residence.

The Middle and Upper Columbia River Team's assessment for this ESU addressed habitat areas within 31 occupied watersheds in 10 associated subbasins (identified below as ''units'' with unique HUC4 numbers), as well as the Columbia River rearing/migration corridor. As part of its assessment, the Team considered the conservation value of each habitat area in the context of the productivity, spatial distribution, and diversity of habitats in the context of each of the four populations in the ESU.

The Middle and Upper Columbia River Team evaluated the conservation value of habitat areas on the basis of the physical and biological habitat requirements of Upper Columbia River *O. mykiss,* consistent with the PCEs identified for Pacific salmon and *O. mykiss* described above in the Methods and Criteria Used to Identify Proposed Critical Habitat section.

Unit 1. Chief Joseph Subbasin (HUC4# 17020005)

This subbasin contains five watersheds, three of which are occupied by the ESU and encompass approximately 817 sq mi (2,116 sq km). Fish distribution and habitat use data from WDFW identify approximately 42 mi (67.6 km) of occupied riverine habitat in the watershed (WDFW, 2003). The Interior Columbia Basin TRT (2003) identified two demographically independent populations (Methow River and Okanogan River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, dams, fire activity and disturbance, forestry, grazing, irrigation impoundments and withdrawals, and roadbuilding. Of the three watersheds reviewed by the Team, habitat areas in one were rated as having medium and those in two were rated as having low conservation value to the ESU (NMFS, 2004a). The Team noted that the Upper Columbia/Swamp watershed contains a high value migration corridor for the Methow River and Okanogan River populations, connecting upstream habitat areas with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 2. Okanogan Subbasin (HUC4# 17020006)

This subbasin contains five occupied watersheds encompassing approximately 2,650 sq mi (6,863 sq km). Fish distribution and habitat use data from WDFW identify approximately 131 mi (210.8 km) of occupied riverine habitat in the watershed (WDFW, 2003). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Okanogan River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, fire activity and disturbance, forestry, grazing, irrigation impoundments and withdrawals, mineral mining, and roadbuilding. Of the five watersheds reviewed by the Team, habitat areas in two were rated as having high and those in three were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team also noted that the watersheds with habitat areas having medium overall ratings contain a high value rearing and migration corridor connecting high value habitat areas upstream with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 3. Similkameen Subbasin (HUC4# 17020007)

This subbasin contains four watersheds, one of which (Lower Similkameen River) is occupied by the ESU. This watershed encompasses approximately 69 sq mi (179 sq km); other historically occupied areas in this subbasin are now blocked by Enloe Dam. Fish distribution and habitat use data from WDFW identify approximately 4 mi (6.4 km) of occupied riverine habitat in the watershed (WDFW, 2003). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Okanogan River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, dams, forestry, grazing, and roadbuilding. The Team also concluded that habitat areas in the Lower Similkameen River watershed warrant a high rating for conservation value to the ESU (NMFS, 2004a). The Team also believed that historically occupied areas upstream of Enloe Dam may be essential for the conservation of the ESU. The Team noted that a recent report describing habitat and fish conditions in this subbasin (Talayco, 2002) observed that Enloe Dam blocks access to more than 95 percent of the potential anadromous fish habitat in the Similkameen River and that there is ''significant potential for increasing spawning and rearing habitat available to anadromous fish in this subbasin by addressing passage barriers such as Enloe Dam.'' This report also noted that ''recently there has been interest in relicensing the Enloe Dam, and fish passage alternatives are being investigated.'' Therefore, the Team concluded that the ESU would likely benefit if the extant population had access to spawning/rearing habitat upstream. We seek comment on whether these areas should be proposed as critical habitat.

Unit 4. Methow Subbasin (HUC4# 17020008)

This subbasin contains seven occupied watersheds encompassing approximately 1,823 sq mi (4,722 sq km). Fish distribution and habitat use data from WDFW identify approximately 216 mi (347.6 km) of occupied riverine habitat in the watershed (WDFW, 2003). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Methow River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, fire activity and disturbance, forestry, grazing, irrigation impoundments and withdrawals, and roadbuilding. Of the seven watersheds reviewed by the Team, habitat areas in all were rated as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 5. Lake Chelan Subbasin (HUC4# 17020009)

This subbasin contains two watersheds, one of which (Lower Chelan) is occupied by the ESU and encompasses approximately 262 sq mi (679 sq km). Most of the stream reaches in this watershed are above the Lake Chelan gorge and were likely historically inaccessible to anadromous fish. Fish distribution and habitat use data from WDFW identify approximately 1 mi (1.6 km) of occupied riverine habitat in the lowermost reach of this watershed (WDFW, 2003). The Interior Columbia Basin TRT (2003) did not associate a demographically independent population with this subbasin but Kaputa (2002) noted that a priority management goal for the Chelan River is to provide spawning and rearing habitat for *O. mykiss* in area near the confluence with the Columbia River. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, fire activity and disturbance, forestry, grazing, and roadbuilding. The Team also concluded that habitat areas in the Lower Chelan watershed warrant a medium rating for conservation value to the ESU (NMFS,

2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 6. Upper Columbia/Entiat Subbasin (HUC4# 17020010)

This subbasin contains four occupied watersheds encompassing approximately 1,491 sq mi (3,862 sq km). Fish distribution and habitat use data from WDFW identify approximately 185 mi (298 km) of occupied riverine habitat in the subbasin (WDFW, 2003). All four demographically independent populations in this ESU (Okanogan River, Methow River, Entiat River, and Wenatchee River) occupy this subbasin (ICBTRT, 2003). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, fire activity and disturbance, forestry, grazing, irrigation impoundments and withdrawals, and roadbuilding. Of the four watersheds reviewed by the Team, habitat areas in three were rated as having high and those in one were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team also noted that the Lake Entiat watershed contains a high value rearing and migration corridor connecting high value upstream watersheds with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 7. Wenatchee Subbasin (HUC4# 17020011)

This subbasin contains five occupied watersheds encompassing approximately 1,328 sq mi (3,440 sq km). Fish distribution and habitat use data from WDFW identify approximately 242 mi (390 km) of occupied riverine habitat in the subbasin (WDFW, 2003). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Wenatchee River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, fire activity and disturbance, forestry, grazing, irrigation impoundments and withdrawals, and roadbuilding. Of the five watersheds reviewed by the Team, habitat areas in four were rated as having high and those in one were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 8. Moses Coulee Subbasin (HUC4# 17020012)

This subbasin contains two watersheds, one of which (Rattlesnake Creek) is occupied by the ESU and encompasses approximately 218 sq mi (565 sq km). Fish distribution and habitat use data from WDFW identify approximately 1 mi (1.6 km) of occupied riverine habitat in the subbasin (WDFW, 2003). The Interior Columbia Basin TRT (2003) did not associate a demographically independent population with this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, fire activity and disturbance, grazing, and irrigation impoundments. The Team also concluded that habitat areas in the occupied watershed warrant a low rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 9. Lower Crab Subbasin (HUC4# 17020015)

This subbasin contains two watersheds, only one of which (Lower Crab Creek) is occupied by the ESU and encompasses approximately 400 sq mi (1,036 sq km). Fish distribution and habitat use data from WDFW identified very little occupied riverine habitat in the subbasin (WDFW, 2003). However, the Team concluded that this was inaccurate and cited distribution information in Quinn (2001) that *O. mykiss* likely spawn further upstream in Crab Creek. The Interior Columbia Basin TRT (2003) did not associate a demographically independent population with this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, fire activity and disturbance, grazing, and irrigation impoundments and withdrawals. The Team also concluded that habitat areas in the Lower Crab Creek watershed warrant a medium rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 10. Upper Columbia/Priest Rapids Subbasin (HUC4# 17020016)

This subbasin contains four watersheds, three of which are occupied by the ESU and encompass approximately 929 sq mi (2,406 sq km). Fish distribution and habitat use data from WDFW identify approximately 113 mi (182 km) of occupied riverine habitat in the subbasin (WDFW, 2003). All four demographically independent populations identified by the Interior Columbia Basin TRT (2003) occupy this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, dams, fire activity and disturbance, forestry, grazing, irrigation impoundments and withdrawals, and roadbuilding. Of the three watersheds reviewed by the Team, all were rated as having high conservation value to the ESU (NMFS, 2004a). The Team also noted that these watersheds also contain a high value rearing and migration corridor connecting high value habitat areas upstream with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 11. Columbia River Corridor

For the purposes of describing units of critical habitat designation for this ESU, we define the Columbia River corridor as that segment from the confluence of the Yakima and Columbia rivers downstream to the Pacific Ocean. This confluence is located in the Columbia River/Zintel Canyon watershed which was the furthest downstream watershed with spawning or tributary PCEs identified in the range of this ESU. Fish distribution and habitat use data from WDFW identify approximately 330 mi (531 km) of occupied riverine and estuarine habitat in this corridor (WDFW, 2003). After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the Team concluded that the Columbia River corridor was of high conservation value to the ESU. The Team noted that this corridor connects every watershed and population in this ESU with the ocean and is used by rearing/migrating juveniles and migrating adults. The Columbia River estuary is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (Marriott *et al.,* 2002).

Management activities that may affect the PCEs in this corridor include channel modifications, dams, irrigation impoundments and withdrawals, roadbuilding, river/estuary traffic, urbanization, and wetland loss and removal.

Snake River Basin O. mykiss ESU

The Snake River Basin *O. mykiss* ESU includes all naturally spawned populations of anadromous *O. mykiss* in streams in the Snake River Basin of southeast Washington, northeast Oregon, and Idaho (62 FR 43937; August 18, 1997). We have proposed that resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations also be included in the Snake River Basin *O. mykiss* ESU. The ESU membership of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, has not been resolved. These resident populations are provisionally not considered to be part of the Snake River Basin *O. mykiss* ESU until such time that significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships. Recent genetic data suggest that native resident *O. mykiss* above Dworshak Dam on the North Fork Clearwater River are part of this ESU. We have proposed that native resident *O. mykiss* populations above Dworshak Dam on the North Fork Clearwater River be considered part of the Snake River Basin *O. mykiss* ESU. Hatchery rainbow trout that have been introduced to the Clearwater River and other areas within the ESU are not considered part of the ESU. We have proposed that six artificial propagation programs be considered part of the ESU (69 FR 33101; June 14, 2004): the Tucannon River, Dworshak NFH, Lolo Creek, North Fork Clearwater, East Fork Salmon River, and the Little Sheep Creek/Imnaha River Hatchery *O. mykiss* hatchery programs.

The Interior Columbia Basin TRT (ICBTRT, 2003) has identified 6 ''major groupings'' of populations in the Snake River Basin *O. mykiss* ESU. The groupings are based on similarities in genetic distances, distances between spawning aggregates, life history, and habitat or environmental considerations. Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of such regions in an ESU (Ruckelshaus *et al.,* 2002; McElhany *et al.,* 2003; McClure, 2004 [pers comm.]).

The Snake River *O. mykiss* ESU is distributed throughout the Snake River drainage system, including tributaries in southeast Washington, eastern Oregon and north/central Idaho. Snake River *O. mykiss* migrate a substantial distance from the ocean (up to 930 mi (1,497 km)) and use high elevation tributaries (typically 3,300–6,600 ft; 1,005.8–2,011.7 m) above sea level) for spawning and juvenile rearing. Snake River *O. mykiss* occupy habitat that is considerably warmer and drier (on an annual basis) than other *O. mykiss* ESUs.

Snake River Basin *O. mykiss* are generally classified as summer run, based on their adult run timing patterns. Summer *O. mykiss* enter the Columbia River from late June to October. After holding over the winter, summer *O. mykiss* spawn during the following spring (March to May). Managers classify up-river summer *O. mykiss* runs into two groups based primarily on ocean age and adult size upon return to the Columbia River. Those classified as A-run *O. mykiss* are predominately age-1 ocean fish, while B-run *O. mykiss* are larger, predominately age-2 ocean fish.

With one exception (the Tucannon River production area), the tributary habitat used by Snake River *O. mykiss* ESU is above Lower Granite Dam. Major groupings of populations and/or subpopulations can be found in: (1) the Lower Snake River tributaries; (2) the Imnaha River drainage; (3) the Grande Ronde River system; (4) the Hells Canyon tributaries; (5) the Clearwater River drainages; and (6) the Salmon River drainages. Resident *O. mykiss* are believed to be present in many of the drainages used by Snake River basin *O. mykiss.* Very little is known about interactions between co-occurring resident and anadromous forms within this ESU (NMFS, 2003).

The Snake River Basin Team's assessment for this ESU addressed habitat areas within 271 occupied watersheds in 25 associated subbasins (identified below as ''units'' with unique HUC4 numbers) as well as the lower Snake/Columbia River rearing/migration corridor. As part of its assessment, the Team considered the conservation value of each habitat area in the context of the productivity, spatial distribution, and diversity of habitats in the context of each of the six major groupings identified by the TRT for this ESU. The Team evaluated the conservation value of habitat areas, on the basis of the physical and biological habitat requirements of Snake River Basin *O. mykiss,* consistent with the PCEs identified for Pacific salmon and *O. mykiss* described above in the Methods and Criteria Used to Identify Proposed Critical Habitat section.

Unit 1. Hells Canyon Subbasin (HUC4# 17060101)

This subbasin contains three watersheds occupied by this ESU and encompasses approximately 541 sq mi (1,401 sq km). Fish distribution and habitat use data from ODFW, U.S. Forest Service (USFS), Bureau of Land Management (BLM), and Idaho Department of Fish and Game (IDFG) identify approximately 152 mi (245 km) of occupied riverine habitat in the watersheds (NMFS, 2004a). The Interior Columbia Basin TRT (2003) determined that although the streams in this subbasin are geographically separated from other major spawning areas, none of these tributaries appears to be large enough to support an independent population. However, the Team determined that maintaining this area may be important for ESU viability or other conservation goals. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including grazing and dams. Of the three watersheds reviewed by the Team, habitat areas in all were rated as having high conservation value to the ESU (NMFS, 2004a). The Team also noted that the northern end of the subbasin provides rearing and migration habitat for the Imnaha River population. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 2. Imnaha River Subbasin (HUC4# 17060102)

This subbasin contains five watersheds occupied by this ESU and encompasses approximately 851 sq mi (2,204 sq km). Fish distribution and habitat use data from ODFW identify approximately 357 mi (575 km) of occupied riverine habitat in the watersheds (ODFW, 2003). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Imnaha River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including forestry, fire activity and disturbance, grazing, irrigation impoundments and withdrawals, roads, and urbanization. Of the five watersheds reviewed by the Team, habitat areas in all were rated as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that

may be essential for the conservation of the ESU.

Unit 3. Lower Snake/Asotin Subbasin (HUC4# 17060103)

This subbasin contains three watersheds occupied by this ESU and encompasses approximately 704 sq mi (1,823 sq km). Fish distribution and habitat use data from ODFW, WDFW, USFS, BLM, and IDFG identify approximately 196 mi (315 km) of occupied riverine habitat in the watersheds (NMFS, 2004a). The Interior Columbia Basin TRT (2003) identified three demographically independent populations (Asotin Creek, Lower Grande Ronde, and Little Salmon and Lower Salmon tributaries) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, forestry, grazing, irrigation impoundments and withdrawals, urbanization, and exotic/invasive species introductions. Of the three watersheds reviewed by the Team, habitat areas in all were rated as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 4. Upper Grande Ronde River Subbasin (HUC4# 17060104)

This subbasin contains eleven watersheds occupied by this ESU and encompasses approximately 1,637 sq mi (4,240 sq km). Fish distribution and habitat use data from ODFW identify approximately 789 mi (1,270 km) of occupied riverine habitat in the watersheds (ODFW, 2003). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Upper Grande Ronde River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications/diking, forestry, fire activity and disturbance, grazing, irrigation impoundments and withdrawals, mineral mining, road building/maintenance, and urbanization. Of the 11 watersheds reviewed by the Team, habitat areas in 9 were rated as having high and those in 2 were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team also noted that the watersheds with habitat areas having medium overall ratings contain a high value rearing and migration corridor connecting high value habitat areas upstream with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 5. Wallowa River Subbasin (HUC4# 17060105)

This subbasin contains six watersheds occupied by this ESU and encompasses approximately 954 sq mi (2,471 sq km). Fish distribution and habitat use data from ODFW identify approximately 265 mi (427 km) of occupied riverine habitat in the watersheds (ODFW, 2003). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Wallowa River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications/diking, forestry, grazing, irrigation impoundments and withdrawals, mineral mining, road building/maintenance, and urbanization. Of the six watersheds reviewed by the Team, habitat areas in five were rated as having high, and those in one were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team noted that the Middle Wallowa River watershed contains a high value rearing and migration corridor connecting high value habitat areas upstream with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 6. Lower Grande Ronde Subbasin (HUC4# 17060106)

This subbasin contains seven watersheds occupied by this ESU and encompasses approximately 1,518 sq mi (3,932 sq km). Fish distribution and habitat use data from ODFW and WDFW identify approximately 576 mi (927 km) of occupied riverine habitat in the watersheds (ODFW, 2003; WDFW, 2003). The Interior Columbia Basin TRT (2003) identified two demographically independent populations (Lower Grande Ronde River and Joseph Creek) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including forestry, grazing, irrigation impoundments and withdrawals, road building/maintenance, river traffic, and exotic/invasive species introductions. The Team also concluded that all of the habitat areas in these seven watersheds warrant a high rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 7. Lower Snake/Tucannon Subbasin (HUC4# 17060107)

This subbasin contains eight watersheds occupied by this ESU and encompasses approximately 1,458 sq mi (3,777 sq km). Fish distribution and habitat use data from WDFW identify approximately 325 mi (523 km) of occupied riverine habitat in the watersheds (WDFW, 2003). The Interior Columbia Basin TRT (2003) identified two demographically independent populations (Asotin Creek and Tucannon River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications/diking, hydroelectric dams, forestry, grazing, irrigation impoundments and withdrawals, road building/maintenance, recreational facilities and activities, river traffic, and exotic/invasive species introductions. Of the eight watersheds reviewed by the Team, habitat areas in two were rated as having high, those in two were rated as having medium, and those in four were rated as having low conservation value to the ESU (NMFS, 2004a). The Team noted that one of the watersheds with habitat areas having a medium overall rating (Snake River/Penawawa Creek) and one with low overall ratings (Snake River/Steptoe Canyon) contain a high value rearing and migration corridor connecting high value upstream habitat areas with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 8. Palouse River Subbasin (HUC4# 17060108)

This subbasin contains one watershed that is occupied by this ESU. The occupied watershed encompasses approximately 199 sq mi (515 sq km). Fish distribution and habitat use data from WDFW identify approximately 8 mi (13 km) of occupied riverine habitat in the watersheds (WDFW, 2003). The Interior Columbia Basin TRT (2003) did not identify a demographically independent population occupying this subbasin. However, the Team determined that this area may provide

spawning habitats during years of high abundance or favorable habitat conditions. Additionally, the Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture and hydroelectric dams. The Team also concluded that habitat areas in the Lower Palouse River watershed warrant a low rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 9. Upper Salmon Subbasin (HUC4# 17060201)

This subbasin contains 27 watersheds occupied by this ESU and encompasses approximately 2,119 sq mi (5,488 sq km). Fish distribution and habitat use data from BLM, IDFG, and USFS identify approximately 551 mi (887 km) of occupied riverine habitat in the watersheds (NMFS, 2004a). The Interior Columbia Basin TRT (2003) identified two demographically independent populations (Upper Mainstem Salmon River and East Fork Salmon River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications/diking, forestry, grazing, irrigation impoundments and withdrawals, mineral mining, road building/maintenance, and urbanization. Of the 27 watersheds reviewed by the Team, habitat areas in 20 were rated as having high, those in six were rated as having medium, and those in one were rated as having low conservation value to the ESU (NMFS, 2004a). The Team noted that three of the watersheds with habitat areas having medium overall ratings (Salmon River/Kinnikinic Creek, Salmon River/Slate Creek, Yankee Fork/Jordan Creek) contain a migration corridor connecting high value habitat areas upstream with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 10. Pahsimeroi Subbasin (HUC4# 17060202)

This subbasin contains seven watersheds, three of which are currently occupied by this ESU. The occupied watersheds encompass approximately 376 sq mi (974 sq km) ; other historically occupied areas in this subbasin are now blocked by irrigation impoundments and low stream flows due to irrigation withdrawals. Fish distribution and habitat use data from BLM, IDFG, and USFS identify approximately 51 mi (82 km) of occupied riverine habitat in the watersheds (NMFS, 2004a). In addition, the Team identified 83 mi (134 km) of unoccupied riverine habitat that may be essential for conservation of the ESU (NMFS, 2004a). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Pahsimeroi River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, grazing, irrigation impoundments and withdrawals, mineral mining, and road building/maintenance. Of the three occupied watersheds reviewed by the Team, habitat areas in one were rated as having high and those in two were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team also believed that historically occupied areas within three watersheds (Big Creek, Pahsimeroi River/Goldberg Creek, Upper Pahsimeroi River) may be essential for the conservation of the ESU. We seek comment on whether these areas should be proposed as critical habitat.

Unit 11. Middle Salmon-Panther Subbasin (HUC4# 17060203)

This subbasin contains 23 watersheds occupied by this ESU and encompasses approximately 1,821 sq mi (4,716 sq km) and 1,987 mi (3,198 km) of streams. Fish distribution and habitat use data from BLM, IDFG, and USFS identify approximately 340 mi (547 km) of occupied riverine habitat in the watersheds (NMFS, 2004a). The Interior Columbia Basin TRT (2003) identified four demographically independent populations (Lemhi River, North Fork Salmon River, Pahsimeroi River, Panther Creek) within this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, hydroelectric dams, forestry, grazing, irrigation impoundments and withdrawals, mineral mining, road building/maintenance, and urbanization. Of the 23 watersheds reviewed by the Team, habitat areas in 16 were rated as having high, those in 6 were rated as having medium, and those in one were rated as having low conservation value to the ESU (NMFS, 2004a). The Team noted that two of the watersheds with habitat areas having medium overall ratings (Panther Creek/Trail Creek and Salmon River/Williams Creek) contain a migration corridor connecting high value habitat areas upstream watersheds with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 12. Lemhi Subbasin (HUC4# 17060204)

This subbasin contains 14 watersheds, 10 of which are currently occupied by this ESU. The occupied watersheds in this subbasin encompass approximately 862 sq mi (2,233 sq km). Fish distribution and habitat use data from BLM, IDFG, and USFS identify approximately 112 mi (180 km) of occupied riverine habitat in the watersheds (NMFS, 2004a). In addition to the occupied riverine habitat, the Team determined that there are 191 mi (307 km) of unoccupied riverine habitat that may be essential for conservation of the ESU (NMFS, 2004a). These segments of unoccupied riverine habitat are found within both occupied and unoccupied watersheds. The Interior Columbia Basin TRT (2003) identified one demographically independent population (Lemhi River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including channel modifications/diking, grazing, irrigation impoundments and withdrawals, mineral mining, and road building/maintenance. Of the 10 watersheds reviewed by the Team, habitat areas in 9 watersheds were rated as having high and those in 1 watershed were rated as having low conservation value to the ESU (NMFS, 2004a). The Team also believed that historically occupied areas within four watersheds (Big Timber Creek, Eighteen Mile Creek, Hawley Creek, Texas Creek) may be essential for the conservation of the ESU. We seek comment on whether these areas should be proposed as critical habitat.

Unit 13. Upper Middle Fork Salmon Subbasin (HUC4# 17060205)

This subbasin contains 13 watersheds occupied by this ESU and encompasses approximately 1,506 sq mi (3,901 sq km). Fish distribution and habitat use data from IDFG and USFS identify approximately 572 mi (921 km) of occupied riverine habitat in the watersheds (NMFS, 2004a). The Interior Columbia Basin TRT (2003) identified

two demographically independent populations (Upper Middle Fork Salmon River and Lower Middle Fork Salmon River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including fire activity and disturbance, grazing, irrigation impoundments and withdrawals, mineral mining, and road building/maintenance. The Team rated all of the habitat areas in these watersheds as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 14. Lower Middle Fork Salmon Subbasin (HUC4# 17060206)

This subbasin contains 17 watersheds occupied by this ESU and encompasses approximately 1,373 sq mi (3,556 sq km). Fish distribution and habitat use data from IDFG and USFS identify approximately 340 mi (547 km) of occupied riverine habitat in the watersheds (NMFS, 2004a). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Lower Middle Fork Salmon River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including fire activity and disturbance, grazing, irrigation impoundments and withdrawals, mineral mining, recreational facilities and activities, and road building/maintenance. The Team rated all of the habitat areas in these watersheds as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 15. Middle Salmon-Chamberlain Subbasin (HUC4# 17060207)

This subbasin contains 19 watersheds occupied by this ESU and encompasses approximately 1,715 sq mi (4,442 sq km). Fish distribution and habitat use data from BLM, IDFG, and USFS identify approximately 402 mi (647 km) of occupied riverine habitat in the watersheds (NMFS, 2004a). The Interior Columbia Basin TRT (2003) identified two demographically independent populations (Chamberlain Creek and Panther Creek) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including forestry, fire activity and disturbance, grazing, irrigation impoundments and withdrawals, mineral mining, and road building/maintenance. Of the 19 watersheds reviewed by the Team, habitat areas in 14 were rated as having high, those in 3 were rated as having medium, and those in 2 were rated as having low conservation value to the ESU (NMFS, 2004a). The Team also noted that the watersheds with habitat areas having medium overall ratings contain a high value rearing and migration corridor connecting high value habitat areas upstream with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 16. South Fork Salmon Subbasin (HUC4# 17060208)

This subbasin contains 15 watersheds occupied by this ESU and encompasses approximately 1,313 sq mi (3,401 sq km). Fish distribution and habitat use data from BLM, IDFG, and USFS identify approximately 410 mi (660 km) of occupied riverine habitat in the watersheds (NMFS, 2004a). The Interior Columbia Basin TRT (2003) identified two demographically independent populations (South Fork Salmon River and Secesh River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including irrigation impoundments and withdrawals, mineral mining, and road building/maintenance. The Team rated all of the habitat areas in these 15 watersheds as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 17. Lower Salmon Subbasin (HUC4# 17060209)

This subbasin contains 17 watersheds occupied by this ESU and encompasses approximately 1,179 sq mi (3,054 sq km). Fish distribution and habitat use data from BLM, IDFG, and USFS identify approximately 317 mi (510 km) of occupied riverine habitat in the watersheds (NMFS, 2004a). The Interior Columbia Basin TRT (2003) identified two demographically independent populations (Chamberlain Creek and Little Salmon and Lower Salmon tributaries) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, forestry, fire activity and disturbance, grazing, mineral mining, road building/maintenance, and urbanization. Of the 17 watersheds reviewed by the Team, habitat areas in 12 were rated as having high, and those in 5 as having medium conservation value to the ESU (NMFS, 2004a). The Team noted that two of the watersheds with habitat areas having medium overall ratings (Salmon River/Hammer Creek and Salmon River/Van Creek) contain a migration corridor connecting high value habitat areas upstream with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 18. Little Salmon Subbasin (HUC4# 17060210)

This subbasin contains seven watersheds, five of which are occupied by this ESU. The occupied watersheds encompass approximately 406 sq mi (1,052 sq km). Fish distribution and habitat use data from BLM, IDFG, and USFS identify approximately 101 mi (163 km) of occupied riverine habitat in the watersheds (NMFS, 2004a). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Little Salmon and Lower Salmon tributaries) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, hydroelectric dams, forestry, fire activity and disturbance, grazing, road building/maintenance, and urbanization. Of the five watersheds reviewed by the Team, habitat areas in two were rated as having high and those in three were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team noted that one of the watersheds (Lower Little Salmon River) with habitat areas having medium overall value contains a high value rearing and migration corridor connecting high value habitat areas upstream with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 19. Upper Selway Subbasin (HUC4# 17060301)

This subbasin contains nine watersheds occupied by this ESU and

encompasses approximately 983 sq mi (2,546 sq km). Fish distribution and habitat use data from IDFG and USFS identify approximately 314 mi (505 km) of occupied riverine habitat in the watersheds (NMFS, 2004a). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Selway River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including fire activity and disturbance. All of the habitat areas in the watersheds reviewed by the Team were rated as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 20. Lower Selway Subbasin (HUC4# 17060302)

This subbasin contains 14 watersheds, 13 of which are occupied by this ESU. The occupied watersheds encompass approximately 1,005 sq mi (2,603 sq km). Fish distribution and habitat use data from IDFG and USFS identify approximately 242 mi (390 km) of occupied riverine habitat in the watersheds (NMFS, 2004a). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Selway River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including forestry, fire activity and disturbance, grazing, and road building/maintenance. All of the habitat areas in watersheds reviewed by the Team were rated as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 21. Lochsa Subbasin (HUC4# 17060303)

This subbasin contains 14 watersheds occupied by this ESU and encompasses approximately 1,178 sq mi (3,051 sq km). Fish distribution and habitat use data from IDFG and USFS identify approximately 277 mi (446 km) of occupied riverine habitat in the watersheds (NMFS, 2004a). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Lochsa River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including forestry, fire activity and disturbance, and road building and maintenance. All of the habitat areas in watersheds reviewed by the Team were rated as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 22. Middle Fork Clearwater Subbasin (HUC4# 17060304)

This subbasin contains two watersheds occupied by this ESU and encompasses approximately 217 sq mi (562 sq km). Fish distribution and habitat use data from BLM, IDFG and USFS identify approximately 80 mi (129 km) of occupied riverine habitat in the watersheds (NMFS, 2004a). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Lower Clearwater River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, forestry, fire activity and disturbance, grazing, road building/maintenance, and urbanization. The Team rated habitat areas in both of the watersheds within this subbasin as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 23. South Fork Clearwater Subbasin (HUC4# 17060305)

This subbasin contains 13 watersheds occupied by this ESU and encompasses approximately 1,176 sq mi (3,046 sq km). Fish distribution and habitat use data from BLM, IDFG and USFS identify approximately 406 mi (653 km) of occupied riverine habitat in the watersheds (NMFS, 2004a). The Interior Columbia Basin TRT (2003) identified two demographically independent populations (South Fork Clearwater River and Lower Clearwater River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, forestry, fire activity and disturbance, grazing, mineral mining, road building/maintenance, and urbanization. Of the 13 watersheds reviewed by the Team, habitat areas in 8 watersheds were rated as having high, those in 3 were rated as having medium, and those in 2 were rated as having low conservation value to the ESU (NMFS, 2004a). The Team noted that two of the watersheds with habitat areas having medium value and one of the watersheds with habitat areas having low value contain a high value rearing and migration corridor connecting high value upstream habitat areas with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 24. Clearwater Subbasin (HUC4# 17060306)

This subbasin contains 31 watersheds, 26 of which are occupied by this ESU. The occupied watersheds encompass approximately 2,046 sq mi (5,299 sq km). Fish distribution and habitat use data from BLM, IDFG and USFS identify approximately 425 mi (684 km) of occupied riverine habitat in the watersheds (NMFS, 2004a). The Interior Columbia Basin TRT (2003) identified two demographically independent populations (Lolo Creek and Lower Clearwater) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, hydroelectric dams, forestry, fire activity and disturbance, grazing, mineral mining, road building/maintenance, and urbanization. Of the 26 watersheds reviewed by the Team, habitat areas in 14 watersheds were rated as having high, those in 9 were rated as having medium, and those in 3 were rated as having low conservation value to the ESU (NMFS, 2004a). The Team noted that five of the watersheds with habitat areas having medium value and two watersheds with habitat areas having low value contain a high value rearing and migration corridor connecting high value upstream habitat areas with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 25. Lower North Fork Clearwater Subbasin (HUC4# 17060308)

This subbasin contains 12 watersheds, one of which is occupied by the anadromous life history type of this ESU. The occupied watershed encompasses approximately 81 sq mi (210 sq km). Fish distribution and habitat use data from IDFG and USFS identify approximately 2 mi (3.2 km) of occupied riverine habitat in the lowermost watershed of the subbasin (NMFS, 2004a). The fish in the occupied habitat are part of the Lower Clearwater

River population (ICBTRT, 2003). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, hydroelectric dams, forestry, fire activity and disturbance, and road building and maintenance. The Team rated the habitat areas in the Lower North Fork Clearwater River watershed as having a low conservation value for the ESU. In addition, the Team also considered whether historically occupied areas of this subbasin (and the upstream subbasin—Upper North Fork Clearwater) above Dworshak Dam are essential for ESU conservation. Although many areas are now inundated, the Team concluded that most of the blocked watersheds are still in good condition. The Team also noted that the Interior Columbia Basin TRT identified these areas as part of a historically independent population and underscored that the resident *O. mykiss* above Dworshak Dam are genetically unique relative to other *O. mykiss* in the Clearwater Basin. A recently completed status review update of this ESU (NMFS, 2003) noted that ''recent genetic data suggest that native resident *O. mykiss* above Dworshak Dam on the North Fork Clearwater should be considered part of this ESU, but hatchery rainbow trout that have been introduced to that and other areas would not.'' Given these considerations, the Team concluded that these blocked watersheds may be essential for ESU conservation, but it was uncertain which specific areas within them may warrant consideration as critical habitat. We seek comment on whether these areas should be proposed as critical habitat.

Unit 26. Lower Snake/Columbia River corridor

Unit 26 consists of the migration corridor that begins in Southeast Washington immediately downstream of the confluence of the Snake River with the Palouse River. The corridor includes approximately 378 mi (608 km) of the Lower Snake and Columbia rivers. Watersheds downstream of the Palouse River are outside of the spawning range of this ESU and likely used in a limited way as juvenile rearing habitat for this ESU. After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the Team concluded that the lower Snake/Columbia River corridor was of high conservation value to the ESU. The Team noted that this corridor connects every watershed and population in this ESU with the ocean and by rearing/migrating juveniles and migrating adults. The Columbia River estuary also contains PCEs and is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (Marriot *et al.,* 2002).

Middle Columbia River O. mykiss ESU

The Middle Columbia River *O. mykiss* ESU includes all naturally spawned populations of anadromous *O. mykiss* in streams from above the Wind River, Washington, and the Hood River, Oregon (exclusive), upstream to, and including, the Yakima River, Washington, excluding *O. mykiss* from the Snake River basin (64 FR 14517; March 25, 1999). We have proposed that resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations also be included in the Middle Columbia River *O. mykiss* ESU (69 FR 33101; June 14, 2004). The ESU membership of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, has not been resolved. These resident populations are provisionally not considered to be part of the Middle Columbia River *O. mykiss* ESU until such time that significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships. We have proposed that seven artificial propagation programs be considered part of the ESU (69 FR 33101; June 14, 2004): the Touchet River Endemic, Yakima River Kelt Reconditioning Program (in Satus Creek, Toppenish Creek, Naches River, and Upper Yakima River), Umatilla River, and the Deschutes River *O. mykiss* hatchery programs.

The Interior Columbia Basin TRT (ICBTRT, 2003) has identified 16 extant demographically independent populations: the Fifteenmile Creek, Deschutes River—westside, Deschutes River—eastside, John Day River lower mainstem tributaries, South Fork John Day River, John Day River upper mainstem, Middle Fork John Day River, North Fork John Day River, Umatilla River, Walla Walla River, Touchet River, Rock Creek, Klickitat River, Toppenish and Satus Creeks, Naches River, and Yakima River upper mainstem populations. The historical White Salmon River population was extirpated with the construction of Condit Dam. The TRT arranged these populations into four major groups in this recovery planning area: (1) Cascades Eastern Slope Tributaries, (2) John Day River, (3) Umatilla and Walla Walla Rivers, and (4) Yakima River. A fifth unaffiliated group consists of at least the Rock Creek drainage (Washington) to the mid-Columbia River. These groupings are based on the proximity of major drainages, distances between spawning aggregations, topography, and genetic and ecological characteristics. Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of population groupings (also called ''strata'') in an ESU (Ruckelshaus *et al.,* 2002; McElhany *et al.,* 2003).

Unlike Pacific salmon, *O. mykiss* are capable of spawning more than once before death. However, it is rare for *O. mykiss* to spawn more than twice before dying, and most that do so are females. *O. mykiss* can be divided into two basic run types based on their level of sexual maturity at the time they enter fresh water and the duration of the spawning migration. The stream-maturing type, or summer *O. mykiss*, enters fresh water in a sexually immature condition and requires several months in fresh water to mature and spawn. The ocean-maturing type, or winter *O. mykiss*, enters fresh water with well-developed gonads and spawns relatively shortly after river entry. Anadromous fish in the Middle Columbia River *O. mykiss* ESU are predominantly summer-run fish, but winter-run fish are found in the Klickitat River in Washington, and Fifteenmile Creek in Oregon.

Both types of *O. mykiss* spawn in cool, clear streams with suitable gravel size, depth, and current velocity. They sometimes also use smaller streams for spawning. Summer-run fish enter fresh water between May and October. During summer and fall before spawning, they hold in cool, deep pools. They migrate inland toward spawning areas, overwinter in the larger rivers, resume migration to natal streams in early spring, and then spawn. Winter-run fish enter fresh water between November and April in the Pacific Northwest, migrate to spawning areas, and then spawn in late winter or spring. Depending on water temperature, *O. mykiss* eggs may incubate for 1.5 to 4 months before hatching. Summer rearing takes place primarily in the faster parts of pools, although young-of-the-year are abundant in glides and riffles. Winter rearing occurs more uniformly at lower densities across a wide range of fast and slow habitat types. Some older juveniles move downstream to rear in larger tributaries and mainstem rivers. Productive *O. mykiss* habitat is characterized by complexity, primarily in the form of large and small wood.

Most anadromous *O. mykiss* in this ESU smolt at 2 years and spend 1 to 2 years in salt water before re-entering fresh water, where they may remain for up to a year before spawning. Age-2-ocean fish dominate the summer run in the Klickitat River, whereas most other rivers with summer-run fish produce about equal numbers of both age-1- and 2-ocean fish. Juvenile life-history stages (*i.e.,* eggs, alevins, fry, and parr) inhabit freshwater/riverine areas throughout the range of the ESU. Parr usually undergo a smolt transformation as 2-year-olds, at which time they migrate to the ocean. Subadults and adults forage in coastal and offshore waters of the North Pacific Ocean before returning to spawn in their natal streams. An inland form of resident *O. mykiss* (redband trout) co-occurs with the anadromous form in this ESU, and juvenile life stages of the two forms can be very difficult to differentiate. In addition, hatchery *O. mykiss* are also distributed throughout the range of this ESU (except for the John Day subbasin).

The Middle and Upper Columbia River Team's assessment of this ESU addressed habitat areas within 111 occupied watersheds in 15 associated subbasins (identified below as ''units'' with unique HUC4 numbers) as well as the Columbia River rearing/migration corridor. As part of its assessment, the Team considered the conservation value of each habitat area in the context of the productivity, spatial distribution, and diversity of habitats in the context of each of the five major groupings identified by the TRT for this ESU. The Team evaluated the conservation value of habitat areas on the basis of the physical and biological habitat requirements of Middle Columbia River *O. mykiss,* consistent with the PCEs identified for Pacific salmon and *O. mykiss* described above in the Methods and Criteria Used to Identify Proposed Critical Habitat section.

Unit 1. Upper Yakima (HUC4# 17030001)

The subbasin contains four occupied watersheds encompassing approximately 2,139 sq mi (5,540 sq km). Fish distribution and habitat use data from WDFW identify approximately 284 mi (457 km) of occupied riverine habitat in the subbasin (WDFW, 2003). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Upper Yakima River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, forestry, fire activity and disturbance, grazing, irrigation impoundments and withdrawals, mineral mining, road building/maintenance, and urbanization. Of the four watersheds reviewed by the Team, habitat areas in three were rated as having high conservation value and those in one were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team noted that the Umtanum/Wenas watershed contains a high value migration corridor connecting high value habitat areas in upstream watersheds with downstream reaches and the ocean. The Team also concluded that several historically occupied areas in this subbasin may be essential for ESU conservation, including upper reaches in Wilson and Naneum creeks (Middle Upper Yakima River watershed) and areas upstream of Cle Elum, Kacheelus, and Kachess dams (Upper Yakima River watershed). These dams block substantial amounts of historical habitat and the Team noted that areas above them were historically important nursery/rearing areas for this ESU and that habitat conditions are still in generally good condition. The Team determined that access to these areas would likely promote the conservation of the ESU. We seek comment on whether these areas should be proposed as critical habitat.

Unit 2. Naches (HUC4# 17030002)

The subbasin contains three occupied watersheds encompassing approximately 1,105 sq mi (2,862 sq km). Fish distribution and habitat use data from the WDFW identify approximately 230 mi (370 km) of occupied riverine habitat in the subbasin (WDFW, 2003). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Naches River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, forestry, fire activity and disturbance, grazing, irrigation impoundments and withdrawals, and road building/maintenance. Habitat areas in all of the watersheds reviewed by the Team were rated as having a high conservation value to the ESU (NMFS, 2004a). The Team also concluded that two historically occupied areas in this subbasin may be essential for ESU conservation, including reaches blocked by Bumping Lake Dam in the Little Naches River watershed and reaches above Tieton Dam in the Naches/Tieton River watershed. The Team noted that areas above both dams were historically important nursery/rearing areas for this ESU and that habitat conditions are in generally good condition. The Team determined that access to these areas would likely promote the conservation of the ESU. We seek comment on whether these areas should be proposed as critical habitat.

Unit 3. Lower Yakima (HUC4# 17030003)

The subbasin contains seven occupied watersheds encompassing approximately 2,903 sq mi (7,519 sq km). Fish distribution and habitat use data from WDFW identify approximately 574 mi (924 km) of occupied riverine habitat in the subbasin (WDFW, 2003). The Interior Columbia Basin TRT (2003) identified two demographically independent populations (Naches River and Satus and Toppenish Creeks) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications/diking, forestry, fire activity and disturbance, grazing, irrigation impoundments and withdrawals, mineral mining, road building/maintenance, and urbanization. Of the seven watersheds reviewed by the Team, habitat areas in four were rated as having high and those in three were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team also concluded that the watersheds with habitat areas having a medium overall rating contain a high value rearing and migration corridor connecting high value habitat areas in upstream watersheds with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 4. Middle Columbia/Lake Wallula (HUC4# 17070101)

The subbasin contains 14 watersheds, 10 of which are occupied by the ESU; 5 of these consist solely of a Columbia River rearing/migration corridor. Occupied watersheds encompass approximately 2,089 sq mi (5,410 sq km). Fish distribution and habitat use data from ODFW and WDFW identify approximately 155 mi (249 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b; WDFW, 2003). Seven of the 16 demographically independent *O. mykiss* populations in this ESU identified by the Interior

Columbia Basin TRT (2003) occupy Columbia River reaches within this subbasin. However, only one of these (Rock Creek, an unaffiliated independent population) is known to spawn here. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, hydroelectric dams, forestry, fire activity and disturbance, grazing, road building/maintenance, and urbanization. Of the 10 watersheds reviewed by the Team, habitat areas in 7 were rated as having high and those in 3 were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 5. Walla Walla (HUC4# 17070102)

The subbasin contains 11 watersheds, 9 of which are occupied by the ESU. Occupied watersheds encompass approximately 1,525 sq mi (3,950 sq km). Fish distribution and habitat use data from ODFW and WDFW identify approximately 531 mi (855 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b; WDFW, 2003). The Interior Columbia Basin TRT (2003) identified two demographically independent populations (Walla Walla River and Touchet River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications/diking, hydroelectric dams, forestry, fire activity and disturbance, grazing, irrigation impoundments and withdrawals, road building/maintenance, and urbanization. Of the nine watersheds reviewed by the Team, habitat areas in five were rated as having high, those in three as having medium, and those in one were rated as having low conservation value to the ESU (NMFS, 2004a). The Team also concluded that while the tributary habitat areas in some of the watersheds were of medium conservation value to the ESU (NMFS, 2004a), the watersheds still contain a high value rearing and migration corridor connecting high value habitat areas in upstream watersheds with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 6. Umatilla (HUC4# 17070103)

The subbasin contains 13 watersheds, 10 of which are occupied by the ESU. Occupied watersheds encompass approximately 1,828 sq mi (4,734 sq km). Fish distribution and habitat use data from ODFW identify approximately 419 mi (674 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Umatilla River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications/diking, forestry, fire activity and disturbance, grazing, irrigation impoundments and withdrawals, road building/maintenance, and urbanization. Of the 10 watersheds reviewed by the Team, habitat areas in 6 were rated as having high, those in 1 as having medium, and those in 3 were rated as having low conservation value to the ESU (NMFS, 2004a). The Team also concluded that while the tributary habitat areas in one of the watersheds was of medium conservation value to the ESU (NMFS, 2004a), the watershed still contains a high value rearing and migration corridor connecting high value habitat areas in upstream watersheds with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 7. Middle Columbia/Hood (HUC4# 17070105)

This subbasin contains 13 watersheds, 8 of which are occupied by this ESU. Occupied watersheds encompass approximately 1,461 sq mi (3,784 sq km). Fish distribution and habitat use data from ODFW and WDFW identify approximately 272 mi (438 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b; WDFW, 2003). The Interior Columbia Basin TRT (2003) identified two demographically independent populations (Klickitat River and Fifteenmile Creek) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications/diking, hydroelectric dams, forestry, fire activity and disturbance, grazing, irrigation impoundments and withdrawals, road building/maintenance, river traffic, and urbanization. Of the eight watersheds reviewed by the Team, habitat areas in three were rated as having high, those in four as medium, and those in one were rated as having low conservation value to the ESU (NMFS, 2004a). The Team also concluded that while the tributary habitat areas in two watersheds were of low and medium conservation value to the ESU (NMFS, 2004a), these watersheds still contain a high value Columbia River rearing and migration corridor connecting high value habitat areas in upstream watersheds with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 8. Klickitat (HUC4# 17070106)

This subbasin contains four occupied watersheds encompassing approximately 1,351 sq mi (3,499 sq km). Fish distribution and habitat use data from WDFW identify approximately 216 mi (348 km) of occupied riverine habitat in the subbasin (WDFW, 2003). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Klickitat River) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, forestry, fire activity and disturbance, grazing, and road building/maintenance. The Team concluded that habitat areas in all of the watersheds in this subbasin are of high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 9. Upper John Day (HUC4# 17070201)

This subbasin contains 15 watersheds, 14 of which are occupied by this ESU. Occupied watersheds encompass approximately 1,991 sq mi (5,157 sq km). Fish distribution and habitat use data from ODFW identify approximately 799 mi (1,286 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The Interior Columbia Basin TRT (2003) identified three demographically independent populations (South Fork John Day, Lower Mainstem John Day, Upper Mainstem John Day) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management

activities that may affect the PCEs, including agriculture, channel modifications/diking, forestry, fire activity and disturbance, grazing, irrigation impoundments and withdrawals, road building/maintenance and urbanization. Of the 13 watersheds reviewed by the Team, habitat areas in 12 watersheds were rated as having high and those in 1 were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team also noted that the Fields Creek watershed contains a high value rearing and migration corridor connecting high value habitat areas in upstream watersheds with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 10. North Fork John Day (HUC4# 17070202)

This subbasin contains 10 occupied watersheds encompassing approximately 1,849 sq mi (4,789 sq km). Fish distribution and habitat use data from ODFW identify approximately 931 mi (1,498 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The Interior Columbia Basin TRT (2003) identified two demographically independent populations (North Fork John Day and Middle Fork John Day) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, forestry, fire activity and disturbance, grazing, mineral mining, and road building/maintenance. Of the 10 watersheds reviewed by the Team, habitat areas in 9 were rated as having high and those in 1 were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team also noted that the Lower North Fork John Day River watershed contains a high value rearing and migration corridor connecting high value habitat areas in upstream watersheds with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 11. Middle Fork John Day (HUC4# 17070203)

This subbasin contains five occupied watersheds encompassing approximately 792 sq mi (2,051 sq km). Fish distribution and habitat use data from ODFW identify approximately 387 mi (623 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Middle Fork John Day) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, forestry, fire activity and disturbance, grazing, irrigation impoundments and withdrawals, mineral mining, and road building/maintenance. Of the five watersheds reviewed by the Team, habitat areas in four were rated as having high and those in one were rated as having low conservation value to the ESU (NMFS, 2004a). The Team also noted that the Lower Middle Fork John Day River watershed contains a high value rearing and migration corridor connecting high value habitat areas in upstream watersheds with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 12. Lower John Day (HUC4# 17070204)

This subbasin contains 14 occupied watersheds encompassing approximately 3,155 sq mi (8,171 sq km). Fish distribution and habitat use data from ODFW identify approximately 829 mi (1,334 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Lower Mainstem John Day) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, forestry, fire activity and disturbance, grazing, irrigation impoundments and withdrawals, and road building/maintenance. Of the 14 watersheds reviewed by the Team, habitat areas in 7 were rated as having high, those in 4 were rated as having medium, and those in 3 were rated as having low conservation value to the ESU (NMFS, 2004a). The Team also noted that the three low value watersheds contain a high value rearing and migration corridor connecting high value habitat areas in upstream watersheds with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 13. Lower Deschutes (HUC4# 17070306)

This subbasin contains 12 watersheds, 9 of which are occupied by this ESU. Occupied watersheds encompass approximately 1,891 sq mi (4,898 sq km). Fish distribution and habitat use data from ODFW identify approximately 357 mi (575 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The Interior Columbia Basin TRT (2003) identified two demographically independent populations (Deschutes River Westside Tributaries and Deschutes River Eastside Tributaries) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications/diking, hydroelectric dams, forestry, fire activity and disturbance, grazing, mineral mining, road building/maintenance, and urbanization. Of the nine watersheds reviewed by the Team, habitat areas in eight were rated as having high and those in one were rated as having low conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 14. Trout (HUC4# 17070307)

This subbasin contains five watersheds, four of which are occupied by this ESU. Occupied watersheds encompass approximately 554 sq mi (1,435 sq km). Fish distribution and habitat use data from ODFW identify approximately 116 mi (187 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). The Interior Columbia Basin TRT (2003) identified one demographically independent population (Deschutes River Eastside Tributaries) occupying this subbasin. The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications/diking, forestry, fire activity and disturbance, grazing, irrigation impoundments and withdrawals, and road building/maintenance. Of the four watersheds reviewed by the Team, habitat areas in two were rated as having high, those in one were rated as having medium and those in one were rated as having low conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas

in this subbasin that may be essential for the conservation of the ESU.

Unit 15. Upper Columbia/Priest Rapids (HUC4# 17020016)

This subbasin contains four watersheds, only one of which (Columbia River/Zintel Canyon) is occupied by the ESU. The occupied watershed encompasses approximately 211 sq mi (546 sq km). Fish distribution and habitat use data from WDFW identify approximately 13 mi (21 km) of occupied riverine habitat in the subbasin consisting of the Columbia River downstream of its confluence with the Yakima River (WDFW, 2003). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, hydroelectric dams, fire activity and disturbance, road building/maintenance, and urbanization. The Team also concluded that habitat areas in the Columbia River/Zintel Canyon watershed warrant a high rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 16. Columbia River Corridor

For the purposes of describing units of critical habitat designation for this ESU, we define the Columbia River corridor as that segment from the confluence of the Wind and Columbia Rivers downstream to the Pacific Ocean. This confluence is located at the downstream boundary of the Middle Columbia/Grays Creek watershed, which was the furthest downstream watershed with spawning or tributary PCEs identified in the range of this ESU. Fish distribution and habitat use data from ODFW and WDFW identify approximately 151 mi (243 km) of occupied riverine and estuarine habitat in this corridor (ODFW, 2003a,b; WDFW, 2003). After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the Team concluded that the Columbia River corridor was of high conservation value to the ESU. The Team noted that this corridor connects habitat areas in every watershed and population in this ESU with the ocean and is used by rearing/migrating juveniles and migrating adults. The Columbia River estuary is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (Marriott *et al.,* 2002). Management activities that may affect the PCEs in this corridor include channel modifications, dams, irrigation impoundments and withdrawals, roadbuilding, river/estuary traffic, roadbuilding, urbanization, and wetland loss and removal. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Lower Columbia River O. mykiss ESU

The Lower Columbia River anadromous *O. mykiss* ESU includes all naturally spawned populations of anadromous *O. mykiss* in streams and tributaries to the Columbia River between the Cowlitz and Wind Rivers, Washington (inclusive), and the Willamette and Hood Rivers, Oregon (inclusive). Excluded are *O. mykiss* in the upper Willamette River Basin above Willamette Falls and *O. mykiss* from the Little and Big White Salmon Rivers in Washington (62 FR 43937; August 18, 1997). We have proposed that resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations be included in the Lower Columbia River *O. mykiss* ESU (69 FR 33101; June 14, 2004). The ESU membership of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, has not been resolved. These resident populations are provisionally not considered to be part of the Lower Columbia River *O. mykiss* ESU until such time that significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships. We have proposed that 10 artificial propagation programs be considered part of the ESU: the Cowlitz Trout Hatchery (in the Cispus, Upper Cowlitz, Lower Cowlitz, and Tilton Rivers), Kalama River Wild (winter- and summer-run), Clackamas Hatchery, Sandy Hatchery, and Hood River (winter- and summer-run) *O. mykiss* hatchery programs (69 FR 33101; June 14, 2004).

The Willamette-Lower Columbia River TRT has identified 23 historical demographically independent populations of Lower Columbia River *O. mykiss*: 18 Western Cascade Range tributaries populations (the Cispus River winter-run, Tilton River winter-run, Upper Cowlitz River winter-run, Lower Cowlitz River winter-run, North Fork Toutle River winter-run, South Fork Toutle River winter-run, Coweeman River winter-run, Kalama River winter-run, Kalama River summer-run, North Fork Lewis River winter-run, East Fork Lewis River winter-run, North Fork Lewis River summer-run, East Fork Lewis River summer-run, Clackamas River winter-run, Salmon Creek winter-run, Sandy River winter-run, Washougal River winter-run, Washougal River summer-run populations); and five Columbia River Gorge tributaries populations (the Lower Gorge tributaries winter-run, Upper Gorge tributaries winter-run, Wind River summer-run, Hood River winter-run, and Hood River summer-run populations) (Myers *et al.,* 2003). The TRT has arranged these populations into ''strata'' based on major life history characteristics (*e.g.,* species run types) and ecological zones (McElhany *et al.,* 2002). The Lower Columbia River *O. mykiss* ESU inhabits two ecological zones (Cascade and Columbia Gorge) and contains two life-history types (summer- and winter-run fish), resulting in a total of four strata for this ESU: Cascade summer- and winter-run populations, and Columbia Gorge summer- and winter-run populations (McElhany *et al.,* 2002). Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of such strata in the ESU (Ruckelshaus *et al.,* 2002; McElhany *et al.,* 2003).

In the Lower Columbia River Basin, migrating adult *O. mykiss* can occur in the Columbia River year-round, but peaks in migratory activity and differences in reproductive ecotype lend themselves to classifying anadromous *O. mykiss* into two races: summer-run and winter-run fish. Summer-run fish return to fresh water from May to October, and enter the Columbia in a sexually immature condition, requiring several months in fresh water to reach sexual maturity and spawn. Winter-run fish enter fresh water from November to April, and return as sexually mature individuals that spawn shortly thereafter.

Some rivers have both summer and winter runs, while others have only one race. Where both runs occur in the same stream, summer-run fish tend to spawn higher in the watershed than do winter forms, perhaps suggesting that summer-run fish tend to exist where winter runs do not fully utilize available habitat. In rivers where both winter and summer forms occur, they are often separated by a seasonal hydrologic barrier, such as a waterfall. Coastal streams are predominantly winter-run fish, whereas interior subbasins are dominated by summer-run fish. Historically, winter-run fish may have been excluded from interior Columbia River subbasins by Celilo Falls.

O. mykiss spawn in clear, cool, well-oxygenated streams with suitable gravel and water velocity. Adult fish waiting to spawn or in the process of spawning are

vulnerable to disturbance and predation in areas without suitable cover. Cover types include overhanging vegetation, undercut banks, submerged vegetation, submerged objects such as logs and rocks, deep water, and turbulence. Spawning occurs earlier in areas of lower elevation and where water temperature is warmer than in areas of higher elevation and cooler water temperature. Spawning occurs from January through May, and precise spawn timing is related to stream temperature. Adult *O. mykiss,* unlike salmon, do not necessarily die after spawning but return to the ocean. However, repeat spawning is not common among anadromous *O. mykiss* migrating several hundred miles or more upstream from the ocean.

O. mykiss eggs hatch in 35 to 50 days depending on water temperature. Following hatching, alevins remain in the gravel 2 to 3 weeks until the yolk-sac is absorbed. Anadromous *O. mykiss* are spring spawners, so they spawn at a time when temperatures are typically cold, but increasing. Their spawning time must optimize avoidance of competing risks from gravel-bed scour during high flow and increasing water temperatures that can become lethal to eggs as the warm season arrives. Fry emergence is principally determined by the time of egg deposition and the water temperature during the incubation period. In the lower Columbia, emergence timing differs slightly between anadromous *O. mykiss* races and among subbasins. The different emergence times between races may be a function of spawning location within the watershed (and hence water temperature) or a result of genetic differentiation between the races. Generally, emergence occurs from March into July, with peak emergence time generally in April and May. Following emergence, fry usually move into shallow and slow-moving margins of the stream. Fry tend to occupy shallow riffle habitats, and as they grow, they inhabit areas with deeper water, a wider range of velocities, and larger substrate.

Anadromous *O. mykiss* exhibit a great deal of variability in smolt age and ocean age. The dominant age class of outmigrating smolts in the lower Columbia River is age 2. In the lower Columbia River, smolt outmigration generally occurs from March to June, with peak migration usually in April or May.

The Lower Columbia River Team's assessment for this ESU addressed habitat areas within 41 occupied watersheds in 9 associated subbasins (identified below as ''units'' with unique HUC4 numbers), as well as the lower Columbia River rearing/migration corridor. As part of its assessment, the Team considered the conservation value of each habitat area in the context of the productivity, spatial distribution, and diversity of habitats across the range of the four life-history type and ecological strata identified by the Willamette/Lower Columbia TRT. The Lower Columbia River Team evaluated the conservation value of habitat areas on the basis of the physical and biological habitat requirements of Lower Columbia River Chinook salmon, consistent with the PCEs identified for Pacific salmon and *O. mykiss* described above in the Methods and Criteria Used to Identify Proposed Critical Habitat section.

Unit 1. Middle Columbia/Hood Subbasin (HUC4# 17070105)

This subbasin contains 13 watersheds, 6 of which are occupied by this ESU and encompass approximately 842 sq mi (2,181 sq km). Fish distribution and habitat use data from ODFW and WDFW identify approximately 299 mi (481 km) of occupied riverine habitat in the watersheds, including a 23-mi (37-km) segment of the Columbia River (ODFW, 2003a,b; WDFW, 2003). Myers *et al.* (2003) identified a single ecological zone (Columbia Gorge) containing two summer-run (Wind River and Hood River) and three winter-run (Upper Gorge Tributaries, Lower Gorge Tributaries, and Hood River) historical demographically independent populations in this subbasin. The Wind River summer-run and Hood River winter-run populations have been classified by the TRT as ''core'' populations (*i.e.,* historically abundant and ''may offer the most likely path to recovery'') (McElhany *et al.,* 2003). Also, the TRT classified the Hood River winter-run fish as a genetic legacy population, *i.e.,* one of ''the most intact representatives of the genetic character of the ESU'' (McElhany *et al.,* 2003). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, forestry, roadbuilding, and urbanization. Of the six watersheds reviewed by the Team, habitat areas in four were rated as having high, those in one were rated as having medium, and those in one were rated as having low conservation value to the ESU (NMFS, 2004a). The Team noted that two watersheds (Middle Columbia/Eagle Creek and Middle Columbia/Grays Creek) contain a high value rearing and migration corridor in the Columbia River connecting high value habitat areas in upstream watersheds with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 2. Lower Columbia/Sandy Subbasin (HUC4# 17080001)

This subbasin contains nine occupied watersheds encompassing approximately 1,076 sq mi (2,787 sq km). Fish distribution and habitat use data from ODFW and WDFW identify approximately 513 mi (826 km) of occupied riverine habitat in the watersheds, including a 26-mi (42-km) segment of the Columbia River (ODFW, 2003a,b; WDFW, 2003). Myers *et al.* (2003) identified two ecological zones (Cascade and Columbia Gorge) containing one summer-run (Washougal River) and four winter-run (Lower Gorge Tributaries, Washougal River, Salmon Creek, and Sandy River) historical demographically independent populations in this subbasin. The Washougal River summer-run and Sandy River winter-run fish have been classified by the TRT as ''core'' populations (*i.e.,* historically abundant and ''may offer the most likely path to recovery'') (McElhany *et al.,* 2003). Also, the TRT classified the Washougal River summer-run fish as a genetic legacy population (*i.e.,* one of ''the most intact representatives of the genetic character of the ESU'') (McElhany *et al.,* 2003). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including channel modifications, dams, forestry, roadbuilding, and urbanization. Of the nine watersheds reviewed by the Team, habitat areas in four were rated as having high and those in five were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team also noted that one watershed (Columbia Gorge Tributaries) contains a high value rearing and migration corridor in the Columbia River connecting high value habitat areas in upstream watersheds with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 3. Lewis Subbasin (HUC4# 17080002)

This subbasin contains six watersheds, two of which are currently occupied by this ESU and the remaining four now blocked by Merwin Dam and others upstream. Occupied watersheds encompass approximately 456 sq mi

(1,181 sq km). Fish distribution and habitat use data from the WDFW identify approximately 250 mi (402 km) of occupied riverine habitat in the watersheds (WDFW, 2003). Myers *et al.* (2003) identified a single ecological zone (Cascade) containing two summer-run (North Fork Lewis River and East Fork Lewis River) and two winter-run (North Fork Lewis River and East Fork Lewis River) historical demographically independent populations in this subbasin. The TRT has classified the North Fork Lewis River winter-run fish as a ''core'' population (historically abundant and ''may offer the most likely path to recovery'') and the East Fork Lewis River summer-run population as a genetic legacy population (one of ''the most intact representatives of the genetic character of the ESU'') (McElhany *et al.*, 2003). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, forestry, roadbuilding, and urbanization. The Team rated habitat areas in both occupied watersheds as having high conservation value to the ESU (NMFS, 2004a). The Team also considered whether inaccessible reaches above Merwin, Yale and Swift dams may be essential to the conservation of this ESU. The Team believed that these unoccupied areas may be important because they once supported a TRT core population, and they contain non-inundated habitats that are likely in good condition relative to other more urbanized watersheds in the Cascade region (Lower Columbia Fish Recovery Board, 2003; McElhany *et al.*, 2003). The Team also noted that the TRT concluded that ''given the limited amount of spawning habitat currently accessible it is unlikely that an independent self-sustaining [summer-run] population could exist'' (Myers *et al.*, 2003). On the other hand, the Team noted that there is currently a substantial amount of habitat still accessible throughout the range of this ESU. Therefore, the Team concluded that the ESU would likely benefit if the extant populations had access to spawning/rearing habitat upstream. We seek comment on whether these areas should be proposed as critical habitat.

Unit 4. Lower Columbia/Clatskanie Subbasin (HUC4# 17080003)

This subbasin contains a single occupied watershed (Kalama River) encompassing approximately 237 sq mi (614 sq km). Fish distribution and habitat use data from WDFW identify approximately 133 mi (214 km) of occupied riverine habitat in the watersheds (WDFW, 2003). Myers *et al.* (2003) identified one ecological zone (Cascade) containing two historical demographically independent populations in this subbasin: Kalama River summer- and winter-run fish. The Kalama River summer-run population has been classified by the TRT as a ''core'' population (i.e., historically abundant and ''may offer the most likely path to recovery'') (McElhany *et al.*, 2003). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including channel modifications, forestry, roadbuilding, and urbanization. The Team also concluded that habitat areas in the Kalama River watershed warrant a high rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 5. Upper Cowlitz Subbasin (HUC4# 17080004)

This subbasin contains five occupied watersheds encompassing approximately 1,026 sq mi (2,657 sq km). Fish distribution and habitat use data from WDFW identify approximately 170 mi (274 km) of occupied riverine habitat in the watersheds (WDFW, 2003). All of this habitat is located upstream of impassable dams (Mayfield and Mossyrock) and only accessible to anadromous fish via trap and haul operations. Myers *et al.* (2003) identified one ecological zone (Cascade) containing two winter-run historical demographically independent populations in this subbasin (Upper Cowlitz River and Cispus River). Both populations have been classified by the TRT as ''core'' populations (i.e., historically abundant and ''may offer the most likely path to recovery'') (McElhany *et al.*, 2003). In addition, the TRT classified the Upper Cowlitz River winter-run population as a genetic legacy population (i.e., one of ''the most intact representatives of the genetic character of the ESU.'') The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, forestry, roadbuilding, and urbanization. The Team also concluded that habitat areas in all five occupied watersheds warrant a high rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 6. Lower Cowlitz Subbasin (HUC4# 17080005)

This subbasin contains eight occupied watersheds encompassing approximately 1,465 sq mi (3,794 sq km). Fish distribution and habitat use data from WDFW identify approximately 785 mi (1,263 km) of occupied riverine habitat in the watersheds (WDFW, 2003). Habitat in two watersheds—Tilton River and Riffe Reservoir—is located upstream of impassable dams (Mayfield and Mossyrock) and only accessible to anadromous fish via trap and haul operations. Data from WDFW identified very little anadromous *O. mykiss* distribution in the Riffe Reservoir watershed (and did not identify the Riffe and Mayfield lakes as occupied habitat). However, the Team determined that these lakes are occupied and contain PCEs for rearing/migrating juveniles based on information regarding migrants described in Wade (2000) as well as their own knowledge of trap and haul operations in this subbasin. Myers *et al.* (2003) identified one ecological zone (Cascade) containing seven historical demographically independent populations of winter-run fish in this subbasin: Cispus River, Upper Cowlitz River, Lower Cowlitz River, Tilton River, North Fork Toutle River, South Fork Toutle River, and Coweeman River. Three populations (Cispus River, Upper Cowlitz River, and North Fork Toutle River) have been classified by the TRT as ''core'' populations, i.e., historically abundant and ''may offer the most likely path to recovery'' (McElhany *et al.*, 2003). In addition, the TRT classified the Upper Cowlitz River winter-run fish as a genetic legacy population, i.e., some of ''the most intact representatives of the genetic character of the ESU.'' The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, dams, forestry, and roadbuilding. Of the eight watersheds reviewed by the Team, habitat areas in three were rated as having high and those in five were rated as having medium conservation value to the ESU (NMFS, 2004a). The Team also noted that four watersheds (Riffe Reservoir, Jackson Prairie, East Willapa, and Coweeman River) contained high value rearing and migration corridors connecting high value habitat areas in

upstream watersheds with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 7. Middle Willamette Subbasin (HUC4# 17090007)

The occupied portion of this subbasin is downstream of Willamette Falls and includes a single watershed (Abernethy Creek) encompassing approximately 136 sq mi (352 sq km) as well as a short segment (approximately 1 mi (1.6 km)) of the Willamette River downstream of Willamette Falls. Fish distribution and habitat use data from ODFW identify approximately 26 mi (42 km) of occupied riverine habitat in the subbasin (ODFW, 2003a,b). Myers *et al.* (2003) identified one ecological zone (Cascade) containing a single historical demographically independent population in this subbasin: Clackamas River winter-run fish. This population has been classified by the TRT as a ''core'' population (i.e., historically abundant and ''may offer the most likely path to recovery'') (McElhany *et al.*, 2003). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, dams, roadbuilding, and urbanization. The Team also concluded that the habitat areas in the Abernethy Creek watershed are of low conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 8. Clackamas Subbasin (HUC4# 17090011)

This subbasin contains six occupied watersheds encompassing approximately 942 sq mi (2,440 km). Fish distribution and habitat use data from ODFW identify approximately 274 mi (441 km) of occupied riverine habitat in the watersheds (ODFW, 2003a,b). Myers *et al.* (2003) identified a single ecological zone (Cascade) containing a single historical demographically independent population in this subbasin: Clackamas River winter-run fish. This population has been classified by the TRT as a ''core'' population (i.e., historically abundant and ''may offer the most likely path to recovery'') (McElhany *et al.*, 2003). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, forestry, roadbuilding, and urbanization. Of the six watersheds reviewed by the Team, habitat areas in all were rated as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 9. Lower Willamette Subbasin (HUC4# 17090012)

This subbasin contains three occupied watersheds encompassing approximately 408 sq mi (1,057 sq km). Two of the watersheds (Columbia Slough/Willamette River and Scappoose Creek) do not contain spawning PCEs for this ESU but instead are used solely for rearing and migration. Fish distribution and habitat use data from ODFW identify approximately 88 mi (142 km) of occupied riverine habitat in the watersheds (ODFW, 2003a,b). Myers *et al.* (2003) identified a single ecological zone (Cascade) containing one historical demographically independent population of winter-run fish in this subbasin (Clackamas River). This population has been classified by the TRT as a ''core'' population (*i.e.*, historically abundant and ''may offer the most likely path to recovery'') (McElhany *et al.* 2003). The Team concluded that all occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, channel modifications, forestry, roadbuilding, and urbanization. Of the three watersheds reviewed by the Team, habitat areas in all three were rated as having high conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 10. Lower Columbia River Corridor

For the purposes of describing units of critical habitat designation for this ESU, we define this corridor as that segment of the Columbia River from the confluences of the Sandy River (Oregon) and Washougal River (Washington) to the Pacific Ocean. Fish distribution and habitat use data from ODFW identify approximately 118 mi (190 km) of occupied riverine and estuarine habitat in this corridor (ODFW, 2003a,b). After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the Team concluded that the lower Columbia River corridor was of high conservation value to the ESU. Other upstream reaches of the Columbia River corridor (within Units 1 and 2 above) are also high value for rearing/migration. The Team noted that this corridor connects habitat areas in every watershed and population in this ESU with the ocean and is used by rearing/migrating juveniles and migrating adults. The Columbia River estuary is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (Marriott *et al.*, 2002). Management activities that may affect the PCEs in this corridor include channel modifications, roadbuilding, river/estuary traffic, roadbuilding, urbanization, and wetland loss and removal.

Upper Willamette River O. mykiss ESU

The Upper Willamette River *O. mykiss* ESU includes all naturally spawned populations of anadromous *O. mykiss* in the Willamette River, Oregon, and its tributaries upstream from Willamette Falls to the Calapooia River (inclusive) (64 FR 14517; March 25, 1999). We have proposed that resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations also be included in the Upper Willamette River *O. mykiss* ESU (69 FR 33101; June 14, 2004). Although there are no obvious physical barriers separating populations upstream of the Calapooia from those lower in the basin, resident *O. mykiss* in these upper basins are quite distinctive both phenotypically and genetically and are not considered part of the ESU. The ESU membership of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, has not been resolved. These resident populations are provisionally not considered to be part of the Upper Willamette River *O. mykiss* ESU, until such time that significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships. This ESU does not include any artificially propagated *O. mykiss* stocks that reside within the historical geographic range of the ESU. Hatchery summer-run fish occur in the Willamette Basin but are an out-of-basin stock that is not included as part of the ESU.

The Willamette-Lower Columbia River TRT has identified four historical demographically independent populations of Upper Willamette River *O. mykiss*: the Mollala River, North Santiam River, South Santiam River, and Calapooia River populations (Myers *et al.*, 2003). The TRT also notes that spawning winter-run fish have been observed in the Westside tributaries to

the Upper Willamette River; however, the Westside tributaries are not considered to have historically constituted a demographically independent population (Myers *et al.*, 2003). The TRT has determined that the Upper Willamette River *O. mykiss* ESU populations comprise a single ''stratum,'' based on major life history characteristics (*e.g.*, species run types) and ecological zones (McElhany *et al.*, 2002). This single stratum consists of the single run-type (winter-run fish) and the single ecological zone (Willamette River) in the ESU. Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of such strata/regions in an ESU (Ruckelshaus *et al.*, 2002; McElhany *et al.*, 2003).

Of the three temporal runs of anadromous *O. mykiss* currently found in the Upper Willamette River ESU, only the late-run winter fish are considered to be native. The same flow conditions at Willamette Falls that only provided access for spring-run chinook salmon also provided an isolating mechanism for this unique run time of anadromous *O. mykiss*. The predominant tributaries to the Willamette River that historically supported winter-run fish all drain the Cascade Range. Anadromous *O. mykiss* populations in the upper Willamette River Basin have been strongly influenced by extensive hatchery transfers of fish throughout the ESU, and the introduction of summer-run fish (facilitated by the laddering of Willamette Falls). Summer-run fish are still stocked in the Upper Willamette River, but the stocking of winter-run fish in the Willamette River has been discontinued (although non-native winter-run fish still return).

It is generally agreed that anadromous *O. mykiss* did not historically emigrate farther upstream than the Calapooia River. The TRT reviewed evidence of anadromous *O. mykiss* using westside tributaries to the Willamette River and concluded that ''with the exception of the Tualatin River, there is little evidence to suggest that sustained spawning aggregations of steelhead may have existed historically in the westside tributaries of the Willamette River Basin. Furthermore, it is unlikely that these tributaries, individually or collectively were large enough to constitute a demographically independent population.''

Late-run Upper Willamette River *O. mykiss* are considered an ocean-maturing type, entering fresh water with well-developed gonads and typically spawning shortly thereafter. Maturing fish enter the Willamette River beginning in January and February, but do not ascend to their spawning areas until late March or April. Spawning takes place from April to June, typically peaking in May, and occurs in both mainstem and tributary habitats in the major Cascade drainages identified above. Presently, native anadromous *O. mykiss* are distributed in a few, relatively small, naturally spawning aggregations.

The juvenile life-history characteristics of Upper Willamette River *O. mykiss* are summarized (where known) in ODFW (1990) and Olsen *et al.* (1992). In the subbasins reviewed, egg/alevin incubation and fry emergence occurred from April to August. Juveniles spend 2 winters rearing in freshwater before emigrating to the ocean from March to July. Upper Willamette River winter-run fish typically spawn as 4-year-olds after 2 years in the ocean.

The Upper Willamette River Team's assessment for this ESU addressed habitat areas within 34 occupied watersheds in 7 associated subbasins (identified below as ''units'' with unique HUC4 numbers), as well as the lower Willamette/Columbia River rearing/migration corridor. As part of its assessment, the Team considered the conservation value of each habitat area in the context of the productivity, spatial distribution, and diversity of habitats across the range of the single life-history type and ecological stratum identified by the Willamette/Lower Columbia TRT. The Lower Columbia River Team evaluated the conservation value of habitat areas on the basis of the physical and biological habitat requirements of Lower Columbia River *O. mykiss* salmon, consistent with the PCEs identified for Pacific salmon and *O. mykiss* described above in the Methods and Criteria Used to Identify Proposed Critical Habitat section.

Unit 1. Upper Willamette Subbasin (HUC4# 17090003)

This subbasin contains six watersheds, three of which are occupied by this ESU and encompass approximately 765 sq mi (1,981 km). Fish distribution and habitat use data from the ODFW identify approximately 241 mi (388 km) of occupied riverine habitat in the watersheds (ODFW, 2003a,b). Myers *et al.* (2003) identified possibly two demographically independent populations in this subbasin, but only one (Calapooia River) with spawning habitat. Myers *et al.* (2003) also noted that there is considerable debate about the origin of naturally spawning winter-run fish currently found in several westside tributaries. These authors went on to state that (with the exception of the Tualatin River) ''there is little evidence to suggest that sustained spawning aggregations of steelhead may have existed historically in the westside tributaries of the Willamette River Basin. Furthermore, it is unlikely that these tributaries, individually or collectively were large enough to constitute a demographically independent population.'' The Team concluded that all of these occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, forestry, roadbuilding, and urbanization. The Team also concluded that habitat areas in one of the watersheds warrant a high rating, and those in two warrant a medium rating for conservation value to the ESU (NMFS, 2004a). The Team also noted that all reaches of the Willamette River within this subbasin constitute a high value rearing and migration corridor for the Calapooia River population with downstream reaches and the ocean. The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 2. North Santiam River Subbasin (HUC4# 17090005)

This subbasin contains six watersheds, three of which are occupied by this ESU and encompass approximately 315 sq mi (816 sq km). Fish distribution and habitat use data from ODFW identify approximately 137 mi (221 km) of occupied riverine habitat in these watersheds (ODFW, 2003a,b). Myers *et al.* (2003) identified one demographically independent population (North Santiam River) in this subbasin. Historically accessible areas in the three uppermost watersheds of this subbasin are now blocked by Big Cliff and Detroit dams but may have been productive anadromous *O. mykiss* habitat (Parkhurst, 1950). The Team concluded that all of the occupied areas contain spawning, rearing, or migration PCEs for this ESU and identified several management activities that may affect the PCEs, including agriculture, dams, forestry, and roadbuilding. The Team also concluded that habitat areas in all three of the occupied watersheds in this subbasin warrant a high rating for conservation value to the ESU (NMFS, 2004a). The Team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.